SOIL SURVEY OF

Forsyth County, North Carolina

United States Department of Agriculture
Soil Conservation Service
In cooperation with
North Carolina Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1963–69. Soil names and descriptions were approved in 1970. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1970. This survey was made cooperatively by the Soil Conservation Service and the North Carolina Agricultural Experiment Station. It is part of the technical assistance furnished to the Forsyth Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Forsyth County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all of the soils of the county in alphabetical order by map symbol. It shows the page where each soil is described and also the page for the capability unit and woodland suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Forsyth County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County."

Cover: **Beef cattle grazing fescue pasture on Chewacla loam.**

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SOIL SURVEY OF FORSYTH COUNTY, NORTH CAROLINA

BY JAMES L. ZIMMERMAN, SOIL CONSERVATION SERVICE

SOILS SURVEYED BY JAMES L. ZIMMERMAN, CLIFFORD M. McCACHREN, AND RONALD B. STEPHENS,[1] SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

FORSYTH COUNTY is in the middle Piedmont Plateau in the north-central part of North Carolina (fig. 1). Winston-Salem is the county seat. The 1960

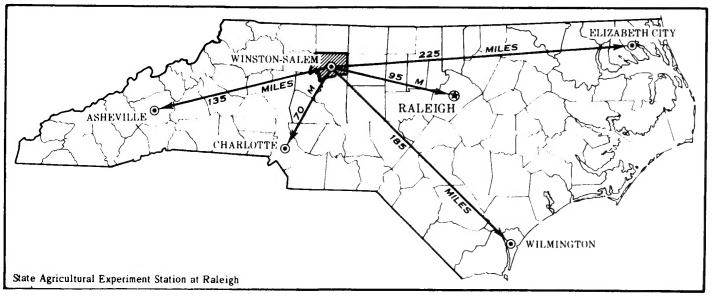

Figure 1.—Location of Forsyth County in North Carolina.

census showed a total county population of 189,428; Winston-Salem, a population of 111,135, and Kernersville, 2,942. Of the total county population, 69.2 percent or 131,084 was urban. There are 271,360 acres of land in the county, or 424 square miles.

The average elevation in the county is about 870 feet above sea level, but generally, it is between 800 and 950 feet. However, there are points in the vicinity of Kernersville and Rural Hall that are about 1,110 feet above sea level, and a point that is less than 700 feet in the southwestern corner where the Yadkin River leaves the county. The county is gently sloping to rolling and has fairly broad ridges. The smoother areas are in the vicinity of Kernersville and Union Cross, and the more hilly topography is along the Yadkin River and the northern edge of the county.

Forsyth County is industrially oriented, but farming is still important to the economy. There are about 3,800 farms, and the average size of a farm is approximately 60 acres. About 85 percent of the farms are operated by their owners, but many farmers also work in industry. Corn, small grain, tobacco, and soybeans are the main crops. Poultry, cattle, and hogs also contribute a considerable part of the farm income.

[1] Others contributing substantially to the survey were JAMES R. REES and SAM H. HEARN.

According to data published in the 1966 North Carolina Conservation Needs Inventory, in Forsyth County, about 69,234 acres is used for crops, 20,489 acres is used for pasture, and 115,037 acres for woodland. Nearly all the acreage is in private farms.

The soils are dominantly acid and strongly leached and have low base saturation. For optimum growth of crops, lime and fertilizer should be applied according to the results of soil tests.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Forsyth County, where they are located, and how they can be used. The soil scientists went into the county knowing they were likely to find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Appling and Pacolet, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other character-

istic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Madison fine sandy loam, 2 to 6 percent slopes, is one of several phases within the Madison series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this soil survey was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of other kinds of soil that have been seen within a mapping unit that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit, the soil complex, is shown on the soil map of Forsyth County.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Wedowee-Louisburg complex is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Gullied land is a land type in this county.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Yields to be expected under high level of management are estimated for all soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different groups of readers, among them farmers, land use planners, managers of woodland, engineers, and homeowners.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups, and then test them by further study and by consultation with farmers, agronomists, engineers, and others. Then, the scientists adjust the groups according to the results of their studies and consultations. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Forsyth County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The terms for color and texture used in the title of the associations apply to the surface layer of the major soils. For example, in the title of association 1, the words, "grayish and brownish, loamy," refer to the color and texture of the surface layer.

The soil associations in Forsyth County are discussed in the following pages.

1. *Chewacla-Wehadkee-Congaree association*

Somewhat poorly drained and poorly drained, grayish and brownish, loamy soils that have a dominantly grayish subsoil, and well drained, brownish, loamy soils that have a yellowish loamy subsoil; on flood plains subject to overflow

This association consists of flood plains. On a typical flood plain the Congaree soils are adjacent to the stream channel and the Chewacla soils are between the Congaree soils and the Wehadkee soils which are at the outer edge of the flood plain and are generally adjacent to steep uplands.

This association makes up about 6 percent of the county. It is about 60 percent Chewacla soils, 20 percent Wehadkee soils, 10 percent Congaree soils, and 10 percent minor soils.

Chewacla soils are somewhat poorly drained. Their surface layer is dark-brown to grayish-brown loam. The subsoil is reddish-brown to gray clay loam to sandy loam. Depth to bedrock is more than 5 feet. These soils are subject to frequent flooding for very brief periods, and the seasonal high water table is at a depth of about 18 inches.

Wehadkee soils are poorly drained. Their surface layer is brown to dark grayish-brown silt loam to sandy loam. The subsoil is brownish-gray to dark-gray clay loam to sandy loam. Depth to bedrock is more than 5 feet. These soils are subject to very frequent flooding

for very brief periods and the seasonal high water table is at or near the surface.

Congaree soils are well drained. Their surface layer is dark yellowish-brown to dark grayish-brown silt loam to fine sandy loam. Below the surface to a depth of about 61 inches is strong-brown or yellowish-brown fine sandy loam or loam.

Minor soils of this association are mainly of the Altavista and Wickham series. These soils are along narrow strips at the base of the upland slopes on which mixed soil material from upland areas has been deposited.

Most of the acreage of this association is cultivated or pastured, and the rest is in forest. The Congaree soils are well suited to most crops, the Chewacla soils are suited to water-tolerant crops and pasture, and the Wehadkee soils are suited to pasture and water-tolerant trees.

Very frequent flooding and a seasonal high water table are the most important limitations for most farm and nonfarm uses of these soils.

2. *Pacolet-Cecil association*

Well-drained, brownish, loamy soils that have a reddish clayey subsoil; on uplands

This association consists of broad smooth ridgetops, long side slopes, and long narrow drainageways. In a typical landscape the Cecil soils are on the ridgetops, the Pacolet soils are on the side slopes, and the Congaree soils are in the drainageways.

This association makes up about 65 percent of the county. It is about 45 percent Pacolet soils, 20 percent Cecil soils, and 35 percent minor soils.

Pacolet soils are well drained. Their surface layer is reddish-brown to grayish-brown fine sandy loam or clay loam. The subsoil is red to yellowish-red clay to sandy clay loam. Depth to bedrock is more than 4 feet.

Cecil soils are well drained. Their surface layer is grayish-brown to reddish-brown sandy loam or clay loam. The subsoil is red clay to clay loam. Depth to bedrock is more than 5 feet.

Minor soils of this association are mainly of the Pacolet, Hiwassee, Wilkes, Vance, and Madison series, and Urban land, on uplands; and of the Chewacla, Wehadkee, and Congaree series along the smaller streams and drainageways.

About half of this association is cultivated or pastured, and the rest is in forest and other nonfarm uses. The soils are well suited to small grain, corn, soybeans, lespedeza, tobacco, and pasture. Practices that conserve water and protect the soil should be used in all cultivated areas.

Slope, moderate shrink-swell potential, and moderate permeability are the most important limitations for both farm and nonfarm uses of these soils.

3. *Enon-Mecklenburg-Vance association*

Well-drained, brownish, loamy soils that have a yellowish or reddish clayey subsoil; on uplands

This association consists of broad ridgetops, long side slopes, and long narrow drainageways. In a typical landscape the Mecklenburg soils are on the ridgetops, the Vance soils are on ridges and side slopes, the Enon soils are on the side slopes, and the Congaree and Chewacla soils are in the narrow drainageways.

This association makes up about 3 percent of the county. It is about 50 percent Enon soils, 20 percent Mecklenburg soils, 15 percent Vance soils, and 15 percent minor soils.

Enon soils are well drained. Their surface layer is dark-brown to light olive-brown fine sandy loam. The subsoil is strong-brown to olive, firm or very firm clay. Depth to bedrock is more than 4 feet.

Mecklenburg soils are well drained. Their surface layer is dark reddish-brown to dark yellowish-brown loam. The subsoil is dark-red to strong-brown, firm clay to clay loam. Depth to bedrock is more than 4 feet.

Vance soils are well drained. Their surface layer is yellowish-brown to grayish-brown sandy loam. The subsoil is yellowish-red to yellowish-brown, firm clay or sandy clay loam. Depth to bedrock is more than 4 feet.

Minor soils of this association are mainly of the Iredell, Pacolet, Hiwassee, Wedowee, and Wilkes series on uplands, and Congaree, Wehadkee, and Chewacla series on flood plains of small streams.

About half of this association is cultivated or pastured, and the rest is in forest or in nonfarm uses. The soils are suited to small grain, corn, soybeans, lespedeza, and pasture. Vance soils are suited to tobacco.

The slow permeability and the high shrink-swell potential of the clayey subsoil are the most important limitations for both farm and nonfarm uses of these soils.

4. *Madison-Pacolet association*

Well-drained, reddish and brownish, loamy soils that have a reddish clayey subsoil; on uplands

This association consists of narrow ridgetops, long side slopes, and long narrow drainageways. In a typical landscape the Pacolet soils are on the ridgetops, the Madison soils are on the long, strongly sloping areas between the ridgetops and the short, steep side slopes, and the Congaree soils are in the narrow drainageways.

This association makes up about 13 percent of the county. It is about 40 percent Madison soils, 25 percent Pacolet soils, and 35 percent minor soils.

Madison soils are well drained. Their surface layer is reddish-brown to dark-brown fine sandy loam or clay loam. The subsoil is red to yellowish-red clay to sandy clay loam. Depth to bedrock is more than 3 feet.

Pacolet soils are well drained. Their surface layer is reddish-brown to grayish-brown fine sandy loam or clay loam. The subsoil is red to yellowish-red clay to sandy clay loam. Depth to bedrock is more than 4 feet.

Minor soils of this association are mainly of the Tallapoosa, Wedowee, Louisburg, and Wilkes series on uplands, and of the Congaree, Wehadkee, and Chewacla series on flood plains of small streams.

Most of the acreage of this association is in nonfarm uses, and the rest is cultivated or pastured. These soils are suited to small grain, corn, soybeans, lespedeza, tobacco, and pasture.

Slope, moderate permeability, and depth to bedrock are important limitations for both farm and nonfarm uses of these soils.

5. *Wedowee-Louisburg association*

Well drained and excessively drained, brownish, loamy soils that have a yellowish clayey subsoil and brownish sandy soils that have a reddish sandy subsoil; on uplands

This association consists of narrow winding ridgetops, long side slopes, and narrow drainageways. In a typical landscape the Wedowee soils are on the ridgetops, the Louisburg soils are on the side slopes, and the Congaree soils are in the narrow drainageways.

This association makes up about 7 percent of the county. It is about 40 percent Wedowee soils, 30 percent Louisburg soils, and 30 percent minor soils.

Wedowee soils are well drained. Their surface layer is yellowish-brown to dark grayish-brown sandy loam. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam. Depth to bedrock is more than 4 feet.

Louisburg soils are well drained to excessively drained. Their surface layer is yellowish-brown to dark grayish-brown loamy sand. The subsoil is yellowish-red to light yellowish-brown sandy loam. Depth to bedrock is 2 to 6 feet or more.

Minor soils of this association are mainly of the Tallapoosa, Pacolet, Vance, Wickham, and Wilkes series and of the Congaree, Wehadkee and Chewacla series on the flood plains of small streams.

Most of the acreage of this association is forested, and the rest is mainly cultivated or pastured. These soils are well suited to fairly well suited to small grain, corn, soybeans, lespedeza, tobacco, and pasture.

Slope and depth to bedrock are important limitations for both farm and nonfarm uses of these soils.

6. *Wilkes-Enon association*

Well-drained, brownish, loamy soils that have a yellowish, clayey subsoil; on uplands

This association consists of narrow winding ridgetops, long steep side slopes, and long narrow drainageways. In a typical landscape the Enon soils are on the ridges, the Wilkes soils are on the steep side slopes, and the Congaree and Chewacla soils are in the drainageways.

This association makes up about 6 percent of the county. It is about 65 percent Wilkes soils, 10 percent Enon soils, and 25 percent minor soils.

Wilkes soils are well drained. Their surface layer is dark grayish-brown to olive-brown loam or sandy loam. The subsoil is strong-brown to olive clay to sandy loam. The upper part of the subsoil generally is clay and the middle and lower parts are clay loam to sandy loam. The depth to bedrock is 2 to 6 feet.

Enon soils are well drained. Their surface layer is dark-brown to light olive-brown fine sandy loam. The subsoil is strong-brown to olive-brown clay. Depth to bedrock is more than 4 feet.

Minor soils of this association are mainly of the Louisburg, Tallapoosa, Madison, Iredell, and Wickham series on uplands, and of the Congaree, Wehadkee, and Chewacla soils on flood plains of small streams.

Most of the acreage of this association is forested, and the rest is pastured or cultivated. This is the steepest and most hilly association in the county. The less sloping areas are fairly well suited to small grain, pasture, and tobacco.

Slope and depth to bedrock are the most important limitations on the major soils of this association for both farm and nonfarm uses.

Descriptions of the Soils

This section describes the soil series and mapping units in Forsyth County. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Gullied land, for example, does not belong to a soil series, but nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability group in which the mapping unit has been placed. The page for the description of each capability unit can be learned by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*7*).[2]

Altavista Series

The Altavista series consists of moderately well drained, nearly level to gently sloping soils on terraces. These soils formed in old alluvial sediments.

In a representative profile the surface layer is grayish-brown fine sandy loam about 8 inches thick. The subsurface layer is light yellowish-brown sandy loam about 3 inches thick. The subsoil is 38 inches thick. The upper part of the subsoil is yellowish-brown,

[2] Italic numbers in parentheses refer to Literature Cited, p. 63.

TABLE 1.—*Approximate acreage and proportionate extent*

Mapping unit	Acres	Percent	Mapping unit	Acres	Percent
Altavista fine sandy loam, 1 to 6 percent slopes	1,292	0.5	Pacolet fine sandy loam, 6 to 10 percent slopes	19,402	7.1
Appling sandy loam, 2 to 6 percent slopes	7,168	2.6	Pacolet fine sandy loam, 10 to 15 percent slopes	10,514	3.9
Appling sandy loam, 6 to 10 percent slopes	3,610	1.3	Pacolet fine sandy loam, 15 to 45 percent slopes	15,952	5.9
Cecil sandy loam, 2 to 6 percent slopes	22,583	8.2	Pacolet clay loam, 2 to 6 percent slopes, eroded	1,127	.4
Cecil sandy loam, 6 to 10 percent slopes	9,139	3.4	Pacolet clay loam, 6 to 10 percent slopes, eroded	7,170	2.6
Cecil sandy loam, 10 to 15 percent slopes	2,139	.8	Pacolet clay loam, 6 to 10 percent slopes, severely eroded	605	.2
Cecil clay loam, 2 to 6 percent slopes, eroded	1,125	.4	Pacolet clay loam, 10 to 15 percent slopes, eroded	6,209	2.3
Cecil clay loam, 6 to 10 percent slopes, eroded	1,894	.7	Pacolet clay loam, 15 to 45 percent slopes, eroded	11,577	4.3
Chewacla loam	15,976	5.9	Pacolet complex, 10 to 25 percent slopes, severely eroded	3,072	1.1
Congaree complex	3,432	1.3	Pacolet-Urban land complex, 2 to 10 percent slopes	9,306	3.4
Cut and fill land	2,336	.9	Pacolet-Urban land complex, 10 to 25 percent slopes	3,579	1.3
Enon fine sandy loam, 2 to 6 percent slopes	1,067	.4	Tallapoosa fine sandy loam, 6 to 15 percent slopes	452	.2
Enon fine sandy loam, 6 to 10 percent slopes	2,825	1.0	Tallapoosa fine sandy loam, 15 to 45 percent slopes	5,869	2.2
Enon fine sandy loam, 10 to 15 percent slopes	1,850	.7	Vance sandy loam, 2 to 6 percent slopes	1,521	.6
Gullied land	2,480	.9	Vance sandy loam, 6 to 10 percent slopes	1,165	.4
Hiwassee loam, 2 to 6 percent slopes	8,126	3.0	Vance sandy loam, 10 to 15 percent slopes	341	.1
Hiwassee loam, 6 to 10 percent slopes	5,915	2.2	Wedowee sandy loam, 2 to 6 percent slopes	836	.3
Hiwassee loam, 10 to 15 percent slopes	2,301	.8	Wedowee sandy loam, 6 to 10 percent slopes	1,935	.7
Hiwassee loam, 15 to 25 percent slopes	1,258	.5	Wedowee sandy loam, 10 to 15 percent slopes	1,830	.7
Hiwassee clay loam, 2 to 6 percent slopes, eroded	1,489	.5	Wedowee-Louisburg complex, 2 to 6 percent slopes	1,093	.4
Hiwassee clay loam, 6 to 10 percent slopes, eroded	2,816	1.0	Wedowee-Louisburg complex, 6 to 10 percent slopes	2,879	1.1
Hiwassee clay loam, 10 to 15 percent slopes, eroded	1,266	.5	Wedowee-Louisburg complex, 10 to 15 percent slopes	1,789	.7
Iredell fine sandy loam, 2 to 6 percent slopes	369	.1	Wehadkee soils	5,583	2.1
Louisburg loamy sand, 6 to 15 percent slopes	309	.1	Wickham fine sandy loam, 2 to 6 percent slopes	1,119	.4
Louisburg loamy sand, 15 to 45 percent slopes	1,698	.6	Wickham fine sandy loam, 6 to 10 percent slopes	716	.3
Louisburg-Wedowee complex, 15 to 25 percent slopes	4,103	1.5	Wickham fine sandy loam, 10 to 15 percent slopes	421	.2
Madison fine sandy loam, 2 to 6 percent slopes	2,666	1.0	Wilkes soils, 6 to 10 percent slopes	3,195	1.2
Madison fine sandy loam, 6 to 10 percent slopes	6,422	2.4	Wilkes soils, 10 to 15 percent slopes	2,735	1.0
Madison fine sandy loam, 10 to 15 percent slopes	2,193	.8	Wilkes soils, 15 to 45 percent slopes	10,655	3.9
Madison fine sandy loam, 15 to 45 percent slopes	1,324	.5			
Madison clay loam, 2 to 6 percent slopes, eroded	470	.2	Total	271,360	100.0
Madison clay loam, 6 to 10 percent slopes, eroded	2,374	.8			
Madison clay loam, 10 to 15 percent slopes, eroded	2,255	.8			
Mecklenburg loam, dark surface variant, 2 to 6 percent slopes	955	.4			
Mecklenburg loam, dark surface variant, 6 to 10 percent slopes	1,126	.4			
Mecklenburg loam, dark surface variant, 10 to 15 percent slopes	438	.2			
Pacolet fine sandy loam, 2 to 6 percent slopes	9,924	3.7			

friable sandy clay loam that has light yellowish-brown and light brownish-gray mottles. The lower part is yellowish-brown, firm sandy clay loam that has light-gray mottles. Below these layers, and extending to a depth of about 70 inches, is light-gray loamy sand.

Altavista soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is moderately deep to deep. The shrink-swell potential is low. Almost half the acreage of the Altavista soils is subject to infrequent flooding of brief duration. Depth to the seasonal high water table is approximately 2½ feet. Unless limed, these soils are strongly acid or medium acid throughout.

Most of the acreage is cultivated or pastured, and the rest is forested. A seasonal high water table, slope, and infrequent flooding of some areas are the most important limitations to the use of these soils.

Representative profile of Altavista fine sandy loam, 1 to 6 percent slopes, ½ mile north of South Fork Creek on old State Highway 150, ⅝ mile west on Darwick Road, ¼ mile south on field road, and 400 feet east of road in an area above the flood plain:

Ap—0 to 8 inches, grayish-brown (2.5Y 5/2) fine sandy loam; moderate, medium, granular structure; very friable; many fine roots; slightly acid; abrupt, smooth boundary.

A2—8 to 11 inches, light yellowish-brown (2.5Y 6/4) sandy loam; common, fine, faint, yellowish-brown mottles; moderate, medium, granular structure; very friable; slightly acid; gradual, wavy boundary.

B21t—11 to 25 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, fine, faint, light yellowish-brown mottles; weak, medium, subangular blocky structure; friable, slightly sticky; medium acid; gradual, wavy boundary.

B22t—25 to 42 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, fine and medium, distinct,

light brownish-gray (2.5Y 6/2) mottles and few, fine, faint, light yellowish-brown mottles; moderate, medium, subangular blocky structure; friable, slightly sticky; few, thin, patchy clay films on faces of peds; medium acid; gradual, wavy boundary.

B3—42 to 49 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, distinct, light-gray (N 7/0) mottles; massive; firm, sticky and slightly plastic; few medium-sized pockets of sand; strongly acid; gradual, wavy boundary.

IIC—49 to 70 inches, light-gray (N 7/0) loamy sand; medium acid.

The solum ranges from 30 to 60 inches in thickness. Depth to bedrock is more than 5 feet. Few to common flakes of mica may occur in any horizon. The A horizon is 5 to 12 inches thick. The A1 or Ap horizon is dark grayish-brown to light olive-brown fine sandy loam or loam. The A2 horizon, if present, is commonly light yellowish-brown sandy loam. The B horizon is 25 to 48 inches thick. In most places the B2t horizon is yellowish-brown sandy clay loam, but in some places it ranges from strong-brown to light olive-brown sandy clay loam or clay loam. In most places the B3 horizon is yellowish-brown sandy clay loam, but in some places it is clay loam or sandy clay. Gray mottles are within a depth of 30 inches. The C horizon commonly is light-gray loamy sand, but it ranges from grayish brown to gray and from loamy sand to clay. In some places the C horizon has stratified layers of sand, gravel, and clay.

Altavista fine sandy loam, 1 to 6 percent slopes (AlB).—This is a moderately well drained soil on low stream terraces along major streams. In many places it is in narrow bands or irregularly shaped areas that are 3 to 15 acres in size.

Included with this soil in mapping are areas of the Wickham, Appling, Chewacla, and Congaree soils and a few areas of similar soils that do not have gray mottles within a depth of 30 inches. Also included are small areas of soils that have a slope of more than 6 percent or that have a clay subsoil.

Infiltration is moderate, and surface runoff is slow to medium. Unless limed, this soil is strongly acid or medium acid throughout. It is subject to infrequent flooding for brief periods.

Most of the acreage is pastured or cultivated, and the rest is forested. The soil is well suited to corn, soybeans, tobacco, fescue, and most other locally grown crops. Because of the slope, the hazard of erosion is moderate. Practices are needed that control runoff and erosion. If crops that require good drainage are to be grown, some of the more nearly level areas should be artificially drained. The soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of lime and fertilizer. This soil has severe limitations for most nonfarm uses because of a seasonal high water table and the risk of flooding of low-lying areas. Capability unit IIe–1; woodland suitability group 2w8.

Appling Series

The Appling series consists of well-drained, gently sloping to sloping soils of the uplands. These soils formed in residuum weathered from granite, gneiss, and other acidic rocks.

In a representative profile the surface layer is light yellowish-brown sandy loam about 7 inches thick. The subsoil, about 41 inches thick, is dominantly strong-brown, firm clay and sandy clay loam that has yellowish-brown mottles. Below these layers, and extending to a depth of about 78 inches, is mottled strong-brown, yellowish-brown, yellowish-red, and red, weathered rock that crushes to sandy loam.

Appling soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is deep, and the shrink-swell potential is low. Depth to the seasonal high water table is more than 5 feet. Unless limed, these soils are very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. Slope, the accompanying hazard of erosion, and moderate permeability are the chief limitations to use of these soils.

Representative profile of Appling sandy loam, 2 to 6 percent slopes, 2 miles west of Kernersville on State Highway 66 and old U.S. Highway 421, 400 feet north of State Highway 66 and 350 feet west of farm road:

Ap—0 to 7 inches, light yellowish-brown (2.5Y 6/4) sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1t—7 to 10 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, fine, subangular blocky structure; friable; common fine roots; thin patchy clay films mainly on vertical faces of peds; strongly acid; gradual, smooth boundary.

B21t—10 to 15 inches, strong-brown (7.5YR 5/6) clay; moderate, medium, subangular blocky structure; firm, sticky and slightly plastic; few fine roots; thin continuous clay films on vertical faces of peds and patchy clay films on horizontal faces; strongly acid; gradual, wavy boundary.

B22t—15 to 34 inches, strong-brown (7.5YR 5/6) clay; common, medium, distinct mottles and streaks of yellowish red (5YR 5/6); moderate, medium, subangular blocky structure; firm, sticky and slightly plastic; distinct continuous clay films on faces of peds; strongly acid; gradual, wavy boundary.

B3t—34 to 48 inches, strong-brown (7.5YR 5/8) sandy clay loam; common, medium, distinct mottles and streaks of yellowish brown (10YR 5/6) and yellowish red (5YR 5/6); weak, fine, subangular blocky structure; firm, sticky and slightly plastic; thin patchy clay films on faces of peds; strongly acid; gradual, wavy boundary.

C—48 to 78 inches, mottled strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), yellowish-red (5YR 4/6), and red (2.5YR 4/6) weathered rock that crushes to sandy loam; massive; friable; streaks and pockets of strong-brown sandy clay loam; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock is more than 5 feet. Mica flakes may be present in any horizon. The A horizon is 5 to 12 inches thick and is dark grayish brown to yellowish brown. The B horizon ranges from 35 to 48 inches in thickness. The B1t horizon, if present, is commonly yellowish-brown sandy clay loam. The B2t horizon is strong-brown to yellowish-red clay to sandy clay. The lower part of the B2t horizon is commonly mottled with red, yellow, or brown. The B3t horizon is yellowish-brown to strong-brown sandy clay loam to sandy clay that has mottles and streaks of red, yellow, or gray. The C horizon is weathered granite or gneiss that crushes to sandy loam to clay loam and normally is mottled and streaked with red, brown, yellow, and gray.

Appling sandy loam, 2 to 6 percent slopes (ApB).—This is a well-drained soil on smooth long ridges of the uplands. It is in broad, irregularly shaped areas that are 5 to 45 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few areas of Cecil, Wedowee, and Vance soils. Also included are

a few areas of soils in small drainageways and depressions that are well drained to somewhat poorly drained, and small areas of a soil that has a yellower, coarser textured subsoil.

Infiltration is moderate, and surface runoff is medium. Unless limed, this Appling soil is very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to all locally grown crops and pasture plants. The main crops are soybeans, corn, small grain, and tobacco. Vegetable crops are well suited to this soil. Because of slope, the hazard of erosion is moderate if this soil is used for row crops. Practices are needed that control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. The main limitations for most nonfarm uses of this soil are slope and moderate permeability. Capability unit IIe–1; woodland suitability group 3o7.

Appling sandy loam, 6 to 10 percent slopes (ApC).—This is a well-drained soil on the upper side slopes on uplands. It is in fairly long areas that range from 5 to 25 acres in size.

The surface layer is grayish-brown to yellowish-brown sandy loam 5 to 9 inches thick. The subsoil is strong-brown to yellowish-red, firm clay to friable sandy clay loam 35 to 45 inches thick. The lower part of the subsoil is mottled with red, yellow, and brown.

Included with this soil in mapping are a few areas of Cecil, Enon, Pacolet, Vance, and Wedowee soils. Also included are a few eroded areas and a few areas of a well-drained to somewhat poorly drained soil along small drainageways and in depressions.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this Appling soil is strongly acid or very strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. This soil is well suited to all locally grown crops. Soybeans, corn, small grain, and tobacco are the main crops. Because of slope, the hazard of erosion is severe if this soil is cultivated. Practices are needed that control runoff and erosion. This soil is relatively easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. Moderate permeability and slope are the most important limitations to nonfarm use of this soil. Capability unit IIIe–1; woodland suitability group 3o7.

Cecil Series

The Cecil series consists of well-drained, gently sloping to strongly sloping soils of the uplands. These soils formed in residuum that weathered from granite, gneiss, and other acidic rocks.

In a representative profile the surface layer is brown sandy loam about 8 inches thick. The subsoil is 44 inches thick. It is red, firm clay and friable clay loam that has strong-brown mottles. Below these layers, and extending to a depth of about 83 inches, is red weathered rock that crushes to clay loam.

Cecil soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is deep, and the shrink-swell potential is low. Unless limed, these soils are very strongly acid to medium acid throughout. The seasonal high water table is at a depth of more than 5 feet.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. Slope and moderate permeability are the most important limitations to the use of these soils.

Representative profile of Cecil sandy loam, 2 to 6 percent slopes, 1 mile north of Union Cross on Union Cross Road, 150 feet east of Union Cross Road, directly in front of Robert B. Glenn School:

Ap—0 to 8 inches, brown (7.5YR 5/4) sandy loam; moderate, medium, granular structure; friable; many fine roots; common fine and medium pores; medium acid; abrupt, smooth boundary.

B21t—8 to 20 inches, red (2.5YR 5/6) clay; moderate, medium, subangular blocky structure; firm, sticky and plastic; common fine roots; thin continuous clay films on faces of peds; few fine flakes of mica; medium acid; gradual, wavy boundary.

B22t—20 to 45 inches, red (2.5YR 4/6) clay; few, medium, distinct, strong-brown (7.5YR 5/8) mottles; moderate, fine, subangular blocky structure; firm, sticky and plastic; few fine roots; thin, continuous, distinct clay films on faces of peds; few fine flakes of mica; strongly acid; gradual, wavy boundary.

B3t—45 to 52 inches, red (2.5YR) clay loam; few, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, fine, subangular blocky structure; friable, sticky and slightly plastic; thin patchy clay films on faces of peds; common fine flakes of mica; few medium-sized pockets of weathered granite or gneiss; strongly acid; gradual, wavy boundary.

C—52 to 83 inches, red (2.5YR 5/8) weathered rock that crushes to clay loam; few, medium, distinct, strong-brown (7.5YR 5/8) mottles; friable, slightly sticky; massive; common fine flakes of mica; few, medium, red clay pockets; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock is more than 5 feet. Mica flakes may be present in any horizon. The A horizon is grayish-brown to yellowish-red sandy loam to clay loam 3 to 10 inches thick. The B horizon is 37 to 50 inches thick. The B2t horizon is red clay. The lower part of the B2t horizon is mottled with yellow or brown in some places. In most places the B3t horizon is red clay loam, but in some places it is sandy clay. The B3t horizon is mottled with brown or yellow in places. The C horizon is weathered, red, acidic rock that crushes to sandy loam to clay loam that is mottled with brown and yellow in places.

Cecil sandy loam, 2 to 6 percent slopes (CcB).—This is a well-drained soil on uplands. It is on smooth, long ridges in broad, irregularly shaped areas that range from 5 to 85 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are a few areas of Appling, Pacolet, and Hiwassee soils. Also included are areas of a similar soil that has gravel on and in the surface layer, some eroded areas, and a few small areas of soils in drainageways and depressions.

Infiltration is moderate, and surface runoff is medium. Unless limed, this Cecil soil is very strongly acid to medium acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or in nonfarm uses. This soil is well suited to all locally grown crops and pasture plants. Corn (fig. 2), soybeans, small grain, and tobacco are the main crops. Because of slope, the hazard of erosion

Figure 2.—Corn growing on Cecil sandy loam, 2 to 6 percent slopes. A field border of fescue provides a place for disposing of runoff and also serves as a turn row for machinery.

is moderate if this soil is used for row crops. Practices are needed that control runoff and erosion. This soil, generally, is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIe–1; woodland suitability group 3o7.

Cecil sandy loam, 6 to 10 percent slopes (CcC).—This is a well-drained soil on the upper side slopes of uplands. It is in fairly long areas that range from 5 to 50 acres in size.

The surface layer is grayish-brown sandy loam 5 to 9 inches thick. The subsoil is mainly red, firm clay and is 37 to 50 inches thick. The lower part of the subsoil is commonly red clay loam that is mottled with yellow or brown in places.

Included with this soil in mapping are a few areas of Appling, Enon, Hiwassee, Pacolet, and Wilkes soils; a few, small, eroded areas; and a few areas of similar soils that have a gravelly surface layer. Also included are areas of similar soils that have a surface layer of yellowish-red clay loam.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this Cecil soil is very strongly acid to medium acid throughout.

Almost half the acreage of this soil is cultivated or pastured, and the rest is forested or is in nonfarm uses. This soil is well suited to most locally grown crops. Corn, soybeans, and tobacco are the main crops. Hay and pasture crops are well suited to this soil. Because of slope, the hazard of erosion is severe if this soil is cultivated. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–1; woodland suitability group 3o7.

Cecil sandy loam, 10 to 15 percent slopes (CcD).—This is a well-drained soil on the lower side slopes bordering the drainageways or above the steeper side slopes on uplands. It is in long, fairly narrow areas that range from 3 to 25 acres in size.

The surface layer is grayish-brown sandy loam 5 to 8 inches thick. The subsoil is mainly red, firm clay and is 37 to 45 inches thick. The lower part of the subsoil is red clay loam that is mottled with yellow or brown in places.

Included with this soil in mapping are areas of Hiwassee, Pacolet, Wilkes, and Madison soils and a few small areas of similar soils that have gravel on or in the surface layer. Also included are areas of similar soils that have a surface layer of yellowish-red clay loam.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this Cecil soil is very strongly acid to medium acid throughout.

Most of the acreage is forested, and the rest is mainly pastured or cultivated. This soil is fairly well suited to most locally grown crops. It is well suited to pasture and trees. The cultivated areas are used mainly for small grain and corn. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. If this soil is used for crops, practices are needed that help control runoff and erosion. The most important limitations for nonfarm use are slope and moderate permeability. Capability unit IVe–1; woodland suitability group 3o7.

Cecil clay loam, 2 to 6 percent slopes, eroded (CeB2).—This is a well-drained soil on uplands. It is on fairly smooth broad ridges in irregularly shaped areas that range from 3 to 50 acres in size.

The surface layer is reddish-brown to yellowish-red clay loam 4 to 7 inches thick. The subsoil is mainly red, firm clay and is 37 to 45 inches thick. The lower part of the subsoil is commonly red clay loam that is mottled with yellow or brown in places.

Included with this soil in mapping are a few areas of Enon, Hiwassee, and Pacolet soils. Also included are small areas of similar soils that have gravel in and on the surface layer.

Infiltration is slow, and surface runoff is medium to rapid. The soil surface crusts after hard rains and clods if worked too wet. Because this affects germination of seeds, it is difficult to obtain good stands of crops. Unless limed, this soil is very strongly acid to medium acid throughout.

About half the acreage of this soil is pastured or cultivated, and the rest is in forest or nonfarm uses. This soil is fairly well suited to most locally grown crops. If cultivated, it is used mainly for small grain and corn. This soil is difficult to keep in good tilth, and the range of moisture content within which it can be worked is narrow. Crops respond well to applications of fertilizer and lime. Because of slope, practices are needed to control runoff and erosion. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–2; woodland suitability group 3o7.

Cecil clay loam, 6 to 10 percent slopes, eroded (CeC2).—This is a well-drained soil on upper side slopes of the uplands. It is in fairly long bands that range from 3 to 40 acres in size.

The surface layer is reddish-brown to yellowish-red clay loam 3 to 6 inches thick. The subsoil is mainly red, firm clay and is 37 to 42 inches thick. The lower part of the subsoil is commonly red clay loam.

Included with this soil in mapping are areas of Pacolet, Madison, and Wilkes soils and small areas that have a gravelly surface layer.

Infiltration is slow, and surface runoff is rapid. The soil surface crusts after hard rains and clods if worked too wet. This affects germination and makes it difficult to obtain good stands of crops. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is forested, and the rest mainly is pastured or cultivated. This soil is well suited to pasture, most hay crops, and trees. It is suited to a limited number of locally grown crops. The soil is difficult to keep in good tilth and the range of moisture content within which it can be worked is narrow. Crops respond well to applications of fertilizer and lime. If this soil is used for row crops, practices should be used that control runoff and erosion. This soil has moderate to severe limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–2; woodland suitability group 3o7.

Chewacla Series

The Chewacla series consists of nearly level, somewhat poorly drained soils of the stream flood plains. These soils formed in recent alluvium.

In a representative profile the surface layer is dark-brown loam about 9 inches thick. The subsoil is about 29 inches thick. The upper part of the subsoil is dark-brown or light olive-brown, friable loam and clay loam that has grayish-brown, light brownish-gray, and yellowish-brown mottles. The lower part is light brownish-gray, friable silty clay loam that has yellowish-brown mottles. Below these layers, and extending to a depth of about 60 inches, is light brownish-gray loamy sand that has strong-brown and olive-gray mottles.

Chewacla soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The shrink-swell potential is low. These soils are flooded frequently for very brief periods of time. Unless limed, these soils are strongly acid or medium acid throughout. Depth to the seasonal high water table is approximately 1½ feet for 2 to 6 months annually.

Most of the acreage is pastured or cultivated, and the rest is forested. A seasonally high water table and frequent flooding are the most important limitations to the use of these soils.

Representative profile of Chewacla loam, 4½ miles north of Winston-Salem, 1½ miles west of U.S. Highway 52, ½ mile south of Weeks Plant, and 100 yards south of road:

Ap—0 to 9 inches, dark-brown (7.5YR 4/4) loam; moderate, medium, granular structure; very friable; many fine roots; few fine flakes of mica; slightly acid; clear, smooth boundary.

B1—9 to 15 inches, dark-brown (7.5YR 4/4) loam; weak, medium, subangular blocky structure; friable; common fine roots; common fine flakes of mica; medium acid; gradual boundary.

B21—15 to 19 inches, dark-brown (7.5YR 4/4) clay loam; few, fine, distinct, grayish-brown mottles; weak, medium, subangular blocky structure; friable; few fine roots; few to common fine flakes of mica; medium acid; gradual boundary.

B22—19 to 34 inches, light olive-brown (2.5Y 5/4) clay loam; common, fine, faint, light brownish-gray and few, medium, distinct, yellowish-brown (10YR 5/6) mottles, and gray mottles that increase with increasing depth; weak, fine, subangular blocky structure; friable, slightly sticky; few fine flakes of mica; medium acid; gradual, wavy boundary.

B3—34 to 38 inches, light brownish-gray (2.5Y 6/2) silty clay loam; many, fine and medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable, slightly sticky; few fine flakes of mica; medium acid; clear, wavy boundary.

C—38 to 60 inches, light brownish-gray (2.5Y 6/2) loamy sand; common, medium, distinct, strong-brown (7.5YR 5/6) and olive-gray (5Y 5/2) mottles; single grained; loose; few fine flakes of mica; medium acid.

The solum ranges from 36 to 60 inches in thickness. Depth to bedrock is more than 5 feet. The A horizon is 7 to 12 inches thick and is dark brown to grayish brown. The B horizon is 29 to 48 inches thick. The B1 horizon is dark-brown, brown, or dark yellowish-brown loam. The B2 horizon is dark-brown, brown, dark yellowish-brown, or light olive-brown loam, clay loam, or silty clay loam. The B3 horizon is light brownish-gray, light yellowish-brown, pale-brown, or gray silty clay loam, loam, or sandy loam. Mottles having chroma of 2 or less are within a depth of 24 inches, and the amount of gray increases with increasing depth. The B horizon has few to common brown mottles and streaks. The C horizon is dominantly gray loamy sand, but ranges from sand to clay and, in places, is stratified layers of sand, silt, and clay. In some profiles this horizon contains water-rounded pebbles.

Chewacla loam (Ch).—This is a somewhat poorly drained soil on flood plains. It occurs in long bands along the streams in areas that range from 1,000 to 6,000 feet or more in length, from 200 to 800 feet in width, and from 5 to 100 acres in size. Narrow bands along the smaller streams are as much as 2 miles long in places. Slopes range from 0 to 2 percent.

Included with this soil in mapping are areas of similar soils that have a less developed subsoil. Also included are areas of Congaree and Wehadkee soils and a few small areas of similar soils that are along the base of slopes and along small drainageways.

Infiltration is moderate, and surface runoff is slow. This soil is subject to frequent flooding for very brief periods in winter. It is flooded occasionally for brief periods during the growing season. Unless limed, the soil is strongly acid or medium acid throughout.

Most of the acreage is pastured or cultivated, and the rest is mostly forested. The soil is fairly well suited to a few locally grown crops. It is well suited to pasture (fig. 3) and to water-tolerant trees. Artificial drainage and flood control are needed to achieve optimum production of adapted crops. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of a seasonally high water table and frequent flooding. Capability unit IIIw–1; woodland suitability group 1w8.

Congaree Series

The Congaree series consists of well-drained soils on stream flood plains. These soils formed in recent alluvium.

Figure 3.—Sheep grazing in a fescue pasture on Chewacla loam.

In a representative profile the surface layer is brown loam about 9 inches thick. The underlying layers, to a depth of about 61 inches, are yellowish-brown, very friable very fine sandy loam and friable loam in the upper part. The lower part is strong-brown or yellowish-brown, friable or very friable loam that has light yellowish-brown or dark-brown mottles. Below these layers, and extending to a depth of about 74 inches, is mottled brown and yellow, stratified loamy sand and sandy loam.

Congaree soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is deep, and the shrink-swell potential is low. These soils are flooded frequently for very brief periods. Depth to the seasonal high water table is approximately 6 feet. Unless limed, these soils are strongly acid to slightly acid throughout.

Frequent flooding is the most important limitation to the use of these soils.

Representative profile of Congaree loam in an area of Congaree complex, 12 miles west of Winston-Salem, on old U.S. Highway 421, one-fourth mile south of old U.S. Highway 421 bridge in Yadkin River bottom, 300 feet east of river, 350 feet south of farm road:

Ap—0 to 9 inches, brown (10YR 4/3) loam; weak, fine, granular structure; friable; few fine roots; few fine flakes of mica; slightly acid; abrupt, smooth boundary.

C1—9 to 24 inches, yellowish-brown (10YR 5/6) very fine sandy loam; moderate, fine, granular structure; very friable; few fine roots; few fine flakes of mica; slightly acid; gradual, wavy boundary.

C2—24 to 36 inches, yellowish-brown (10YR 5/6) loam; moderate, medium, granular structure; friable; few fine flakes of mica; medium acid; gradual, wavy boundary.

C3—36 to 45 inches, strong-brown (7.5YR 5/6) loam; weak, fine, granular structure; friable; few fine flakes of mica; few, fine, black specks and concretions; slightly acid; gradual, wavy boundary.

C4—45 to 61 inches, yellowish-brown (10YR 5/4) loam; few, fine, faint, light yellowish-brown mottles and common, distinct, dark-brown (10YR 3/3) mottles; weak, medium, granular structure; very friable; common fine flakes of mica; slightly acid; clear, smooth boundary.

C5—61 to 74 inches, mottled brown (10YR 4/3) and yellow (10YR 7/6) stratified loamy sand and sandy loam; massive; very friable; many, fine, black concretions; common fine and few medium flakes of mica; common black organic chips and flakes; medium acid.

Depth to bedrock is more than 5 feet. The A horizon is dark grayish brown to dark yellowish brown. It is loam, silt loam, or fine sandy loam 7 to 14 inches thick. In most places the C horizon, to a depth of 61 inches, is strong-brown, yellowish-brown, or pale-brown loam or fine sandy loam to silty clay loam, but in some profiles it contains thin layers of loamy sand or clay. The lower part of the C horizon in some profiles has mottles of gray, brown, or yellow. Below a depth of 61 inches is brownish-gray to dark-brown loamy sand to silty clay.

Congaree complex (Co).—This mapping unit consists of well-drained soils on flood plains. These soils are in narrow to wide bands adjacent to the streams. The areas range in size from 3 to 200 acres. Slopes range from 0 to 2 percent.

Congaree soils and soils that have more sand or more clay and a better developed profile than the Congaree soils are in areas so intricately mixed that they cannot be separated. In an average area of the mapping unit, about 60 percent is Congaree soils and about 35 percent is the soils that have a better developed profile.

Included with this complex in mapping are a few areas of Chewacla and Altavista soils.

Infiltration is moderate, and surface runoff is slow. Unless limed, these soils are strongly acid to slightly acid throughout. The soils are subject to very frequent flooding for very brief periods.

Most of the acreage is pastured or cultivated. These soils are well suited to all locally grown crops. Normally, damage to crops from flooding is not severe, but some kind of flood control should be used in cultivated areas. These soils are easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of lime and fertilizer. These soils have severe limitations for most nonfarm uses because of flooding. Capability unit IIw–1; woodland suitability group 1o7.

Cut and Fill Land

Cut and fill land (Cu) consists of areas that have been so altered by man that the original soil profile and topography are not recognizable. The areas generally are sandy clay loam to clay. Slopes generally are less than 4 percent, but are steep on one or more sides. This land type is mainly on uplands where the original soils have been cut or filled, or both. In places, all the original surface layer and subsoil and part of the underlying material, have been removed by cuts, but in other places, the original soil is covered by fill more than 5 feet thick.

This unit is used mainly for parking lots, playgrounds, and industrial sites, or it is along railroad yards and four-lane highway interchanges. The land is so variable from one place to another that soil characteristics are difficult to specify. Onsite examination of each area should be made before any treatment or practice is used. Not in a capability unit or a woodland suitability group.

Enon Series

The Enon series consists of well-drained, gently

sloping to strongly sloping soils on uplands. These soils formed in residuum that weathered from diorite, schist, gneiss, and other mixed acidic and basic rocks.

In a representative profile the surface layer is dark-brown fine sandy loam about 7 inches thick. The subsoil, about 30 inches thick, is yellowish-brown and strong-brown, very firm and firm clay that has yellowish-red and light-gray mottles. Below these layers, and extending to a depth of about 60 inches, is mottled brown, yellow, gray, highly weathered rock that crushes to fine sandy loam.

Enon soils are high in natural fertility and low in organic-matter content. Permeability is slow, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is high. Depth to the seasonal high water table is more than 5 feet. Unless limed, these soils are medium acid to neutral throughout.

About half the acreage is pastured or cultivated, and the rest is in forest or nonfarm uses. Slope, slow permeability, and high shrink-swell potential are the most important limitations to the use of these soils.

Representative profile of Enon fine sandy loam, 6 to 10 percent slopes, 8 miles southwest of Winston-Salem on U.S. Highway 158, 0.3 mile south on State Road 2991, 950 feet west on private road:

Ap—0 to 7 inches, dark-brown (10YR 4/3) fine sandy loam; moderate, medium, granular structure; very friable; many fine roots; neutral; abrupt, smooth boundary.

B21t—7 to 24 inches, yellowish-brown (10YR 5/6) clay; few, fine, distinct, yellowish-red mottles; strong, medium, angular blocky structure; very firm, very sticky and very plastic; slightly acid; gradual, wavy boundary.

B22t—24 to 32 inches, strong-brown (7.5YR 5/6) clay; common, fine, distinct, yellowish-red mottles; strong, medium, angular blocky structure; very firm, very sticky and very plastic; slightly acid; gradual, wavy boundary.

B3—32 to 37 inches, yellowish-brown (10YR 5/6) clay; common, medium, distinct, light-gray (10YR 7/2) mottles and few, fine, faint, yellowish-red mottles; massive; firm, plastic; neutral; gradual, wavy boundary.

C—37 to 60 inches, mottled brown, yellow, and gray, highly weathered rock that crushes to fine sandy loam; massive; friable; neutral.

The solum ranges from 20 to 40 inches in thickness. Depth to bedrock is more than 4 feet. The A horizon is 4 to 10 inches thick and is dark brown or dark grayish brown to light olive brown. The B horizon is 16 to 30 inches thick. The B2 horizon is strong-brown or yellowish-brown clay. The B3 horizon is yellowish-brown to olive sandy clay loam to clay. The C horizon is mottled yellowish-red, yellowish-brown, brownish-yellow, gray, or olive weathered rock that crushes to fine sandy loam to clay. Many profiles have black manganese concretions throughout.

Enon fine sandy loam, 2 to 6 percent slopes (EnB).—This is a well-drained soil on fairly smooth, narrow ridges in areas that range from 3 to 35 acres in size.

The surface layer is brown to olive-brown fine sandy loam 4 to 10 inches thick. The subsoil is strong-brown to olive, very firm to firm clay 16 to 30 inches thick.

Included with this soil in mapping are areas of Wilkes, Mecklenburg, Pacolet, and Wedowee soils.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is medium acid to neutral throughout.

About half of the acreage is pastured or cultivated, and the rest is in forest or other uses. This soil is fairly well suited to most locally grown crops. Small grain, tobacco, and corn are the main crops. The erosion hazard is moderate if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slow permeability and high shrink-swell potential. Capability unit IIe–3; woodland suitability group 4o1.

Enon fine sandy loam, 6 to 10 percent slopes (EnC).—This is a well-drained soil on uplands. It is on fairly smooth side slopes in areas ranging from 3 to 30 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of Wilkes, Pacolet, Mecklenburg, and Wedowee soils. Also included are a few areas of similar soils that have gray mottles at a depth of about 25 to 30 inches.

Infiltration is moderately slow, and surface runoff is rapid. Unless limed, this soil is medium acid to neutral throughout.

About half of the acreage is pastured or cultivated, and the rest is in forest or other uses. This soil is fairly well suited to most locally grown crops. Small grain, tobacco, and corn are the main crops. The hazard of erosion is severe if this soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope, slow permeability, and high shrink-swell potential. Capability unit IIIe–3; woodland suitability group 4o1.

Enon fine sandy loam, 10 to 15 percent slopes (EnD).—This is a well-drained soil on narrow side slopes of the uplands. The areas generally are adjacent to drainageways or just above sharp, steep breaks to streams. They are 3 to 20 acres in size.

The surface layer is brown to olive-brown fine sandy loam 4 to 8 inches thick. The subsoil is strong-brown to olive, very firm to firm clay 16 to 25 inches thick.

Included with this soil in mapping are areas of Wilkes and Wedowee soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is medium acid to neutral throughout.

Most of the acreage is in forest, and the rest is mainly pastured or cultivated. This soil is fairly well suited to most locally grown crops. Small grain, tobacco, and pasture are the main crops. The hazard of erosion is very severe if this soil is used for row crops. Practices that control runoff and erosion are needed. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slow permeability, slope, and high shrink-swell potential. Capability unit IVe–3; woodland suitability group 4o1.

Gullied Land

Gullied land (Gu) is mainly on uplands in steeper areas where the soils have been eroded beyond reasonable reclamation. Generally, these areas are only a few acres in size, but in places they are as large as 20 acres. The gullies generally are 3 or more feet deep, have steep or vertical side slopes, and have been cut through the surface layer and the subsoil into the parent material. In some places gullies are so numerous that only traces of the original soil remain (fig. 4). In places narrow ridges of the original soil remain between the gullies.

Figure 4.—Area of Gullied land.

In most places this land type has a surface layer of clay loam. Infiltration is slow, and surface runoff is very rapid. The organic-matter content and natural fertility are low. This land type is better suited to trees or wildlife habitat than to most other uses, but trees and plants grow very slowly unless further erosion is controlled and the land is fertilized and limed. Capability unit VIIe–2; not in a woodland suitability group.

Hiwassee Series

The Hiwassee series consists of well-drained, gently sloping to moderately steep soils of the uplands. These soils formed in residuum that weathered from gneiss, schist, and other mixed acidic and basic rocks, or they formed in old alluvium.

In a representative profile the surface layer is dark reddish-brown loam about 7 inches thick. The subsoil, about 50 inches thick, is dark-red, firm clay and clay loam that has brownish-yellow mottles. Below these layers, and extending to a depth of about 84 inches, is red, weathered mica gneiss that crushes to sandy clay loam that has reddish-yellow mottles.

Hiwassee soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is deep, and the shrink-swell potential is low. Unless limed, these soils are very strongly acid to slightly acid throughout. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage is cleared and is cultivated or pastured, and the rest is in forest or nonfarm uses. Slope and moderate permeability are the most important limitations to the use of these soils.

Representative profile of Hiwassee loam, 2 to 6 percent slopes, 7 miles northwest of Winston-Salem on U.S. Highway 67, 1.1 miles north on State Road 1688, 2.2 miles north on State Highway 65, 0.1 mile west on County Road 1828, 0.2 mile northwest on private road, 100 feet north of private road:

Ap—0 to 7 inches, dark reddish-brown (5YR 3/4) loam; moderate, fine, granular structure; friable; many fine roots; slightly acid; abrupt, smooth boundary.

B21t—7 to 32 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; firm, very sticky and plastic; common fine roots and few medium roots; thin, continuous, distinct clay films on faces of peds; slightly acid; gradual, wavy boundary.

B22t—32 to 44 inches, dark-red (2.5YR 3/6) clay; moderate, fine, subangular blocky structure; firm, very sticky and plastic; few fine roots; thin continuous clay films on faces of peds; few to common fine flakes of mica; slightly acid; gradual, wavy boundary.

B3t—44 to 57 inches, dark-red (2.5YR 3/6) clay loam; few, fine, distinct, brownish-yellow mottles; weak, fine, subangular blocky structure; firm, sticky and slightly plastic; thin patchy clay films dominantly on vertical faces of peds; common fine flakes of mica; medium acid; gradual boundary.

C—57 to 84 inches, red (2.5YR 4/8) weathered mica gneiss that crushes to sandy clay loam; common, medium, distinct, reddish-yellow (7.5YR 6/8) mottles; few fine streaks of black; massive; friable, slightly sticky and slightly plastic; common to many fine flakes of mica; medium acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock is more than 5 feet. The A horizon is dark reddish-brown to reddish-brown loam or clay loam 4 to 10 inches thick. The B horizon is 36 to 50 inches thick. The upper part of the B2t horizon is dark-red clay, and the lower part is dark-red to red clay or clay loam. The B3t horizon is commonly dark-red clay loam or clay. The C horizon is red to yellowish-red loam or sandy clay loam. In many places this horizon contains water-rounded gravel.

Hiwassee loam, 2 to 6 percent slopes (HlB).—This is a well-drained soil on smooth, broad ridges of the uplands. It is in long, wide belts or broad, irregularly shaped areas that are 5 to 150 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are many areas of similar soils that have a surface layer of fine sandy loam. Also included are a few areas of Enon and Mecklenburg soils and, in depressions and draws, areas of soils that have a thicker surface layer.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is very strongly acid to slightly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is forested or in nonfarm uses. This soil is well suited to most locally grown crops. Corn, small grain, and soybeans are the main crops. This soil is also well suited to pasture or trees. Because of slope, the hazard of erosion is moderate if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer

and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIe–2; woodland suitability group 3o7.

Hiwassee loam, 6 to 10 percent slopes (HlC).—This is a well-drained soil on uplands. It is in smooth, fairly broad areas on upper side slopes or in broad, irregularly shaped, undulating areas. The areas range from 5 to 70 acres in size.

The surface layer is dark reddish-brown to reddish-brown loam 4 to 10 inches thick. The subsoil is dark-red to red clay and clay loam 36 to 50 inches thick.

Included with this soil in mapping are areas of similar soils that have a surface layer of fine sandy loam. Also included are a few areas of Enon and Mecklenburg soils.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this soil is very strongly acid to slightly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is forested or in nonfarm uses. This soil is well suited to most locally grown crops. Corn, small grain, and soybeans are the main crops. This soil is also well suited to pasture or trees. Because of slope, the hazard of erosion is severe if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–2; woodland suitability group 3o7.

Hiwassee loam, 10 to 15 percent slopes (HlD).—This is a well-drained soil on uplands. It is on the fairly narrow, lower side slopes adjacent to drainageways or to steeper areas. The soil is in areas that range from 3 to 65 acres in size.

The surface layer is dark reddish-brown to reddish-brown loam 4 to 10 inches thick. The subsoil is dark-red to red clay and clay loam 36 to 45 inches thick.

Included with this soil in mapping are areas of similar soils that have a surface layer of fine sandy loam. Also included are a few areas of Wilkes and Pacolet soils and a few areas of similar soils that have a thinner surface layer and subsoil.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid to slightly acid throughout.

Almost half of the acreage is cultivated or pastured, and the rest is forested or in nonfarm uses. Because of slope, this soil is only fairly well suited to most locally grown crops. It is well suited to pasture or trees. The hazard of erosion is very severe if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is somewhat difficult to keep in good tilth but can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–2; woodland suitability group 3o7.

Hiwassee loam, 15 to 25 percent slopes (HlE).—This is a well-drained soil on uplands. It is on the long, narrow side slopes bordering the streams and drainageways in areas that range from 3 to 50 acres in size.

The surface layer is dark reddish-brown to reddish-brown loam 4 to 9 inches thick. The subsoil is dark-red to red clay and clay loam 36 to 40 inches thick.

Included with this soil in mapping are areas of similar soils that have a thinner surface layer and subsoil. Also included are a few areas of Wilkes and Madison soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid to slightly acid throughout.

Most of the acreage is forested, and the rest is pastured, cultivated, or in nonfarm uses. Because of slope, this soil is poorly suited to cultivation. It is somewhat difficult to keep in good tilth but can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope and moderate permeability. Capability unit VIe–2; woodland suitability group 3r8.

Hiwassee clay loam, 2 to 6 percent slopes, eroded (HmB2).—This is a well-drained soil on smooth, broad ridges of the uplands. It is in irregularly shaped areas that range from 4 to 65 acres in size.

The surface layer is dark reddish-brown clay loam 4 to 8 inches thick. The subsoil is dark-red to red clay and clay loam 36 to 45 inches thick.

Included with this soil in mapping are areas of Enon and Mecklenburg soils and a few areas of similar soils that have a surface layer of loam and fine sandy loam.

Infiltration is slow, and surface runoff is moderately rapid. The surface crusts after hard rains and clods if worked when too wet. This affects germination, making it difficult to obtain uniform stands. Unless limed, this soil is very strongly acid to slightly acid throughout.

About half the acreage is pastured or cultivated, and the rest is forested or in nonfarm uses. This soil is fairly well suited to most locally grown crops, except tobacco and vegetables. It is well suited to pasture, hay, and trees. Where cultivated, this soil is used mainly for small grain, corn, and milo. Because of the slope and slow infiltration of water, the hazard of further erosion is severe if the soil is used for row crops. Practices are needed that control runoff and further erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–2; woodland suitability group 3o7.

Hiwassee clay loam, 6 to 10 percent slopes, eroded (HmC2).—This is a well-drained soil on uplands. It is on smooth, fairly broad, upper side slopes or in irregularly shaped areas. Areas of this soil range from 5 to 60 acres in size.

The surface layer is dark reddish-brown to reddish-brown clay loam 4 to 7 inches thick. The subsoil is dark-red to red clay and clay loam 36 to 45 inches thick.

Included with this soil in mapping are areas of similar soils that have a surface layer of fine sandy loam or loam. Also included are a few areas of Pacolet and Mecklenburg soils.

Infiltration is slow, and surface runoff is rapid. The

surface crusts after hard rains and the surface layer clods if worked too wet. Unless it is limed, this soil is very strongly acid to slightly acid throughout.

Most of the acreage is in forest or nonfarm uses, and the rest is mostly cultivated or pastured. This soil is fairly well suited to small grain, corn, and most other locally grown crops. It is well suited to pasture or trees. Because of the slope, the hazard of further erosion is very severe if the soil is used for row crops. Practices are needed that control runoff and further erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–2; woodland suitability group 3o7.

Hiwassee clay loam, 10 to 15 percent slopes, eroded (HmD2).—This is a well-drained soil on uplands. It is on the fairly narrow, lower side slopes adjacent to drainageways or above steeper slopes, in areas that range from 3 to 55 acres in size.

The surface layer is dark reddish-brown to reddish-brown clay loam 4 to 6 inches thick. The subsoil is dark-red to red clay and clay loam 36 to 40 inches thick.

Included with this soil in mapping are areas of similar soils that have a surface layer of fine sandy loam and loam and some similar soils that have a subsoil less than 36 inches thick. Also included are a few areas of Wilkes and Pacolet soils.

Infiltration is slow, and surface runoff is very rapid. The surface crusts after hard rains and the surface clods if worked when wet. Unless it is limed, this soil is very strongly acid to slightly acid throughout.

Most of the acreage is in forest or nonfarm uses, and the rest is cultivated or pastured. This soil is poorly suited to most cultivated crops. It is well suited to pasture or trees. Because of slope, the hazard of further erosion is very severe if this soil is used for row crops. Practices are needed that help control runoff and further erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–2; woodland suitability group 3o7.

Iredell Series

The Iredell series consists of moderately well drained, gently sloping soils of the uplands. These soils formed in residuum that weathered from diorate and other basic rocks.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 8 inches thick. The subsoil, about 19 inches thick, is olive-brown and olive, very firm clay that has light olive-gray and olive-brown mottles. Below these layers, and extending to a depth of about 57 inches, is mottled green, gray, and black, weathered rock that crushes to loam.

Iredell soils are high in natural fertility and low in organic-matter content. Permeability is slow, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is high. Unless limed, these soils are medium acid to neutral throughout. Depth to the seasonal high water table is 1 to 2 feet, or 1 to 10 days in spring.

About half of the acreage is pastured or cultivated, and the rest is in forest or nonfarm uses. Slope, slow permeability, and high shrink-swell potential are the most important limitations to the use of these soils.

Representative profile of Iredell fine sandy loam, 2 to 6 percent slopes, 1.5 miles west of Lewisville on State Road 1001, 0.2 mile north of State Road 1001 on State Road 1305, 125 feet east of State Road 1305 in a field:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) fine sandy loam; moderate, fine, granular structure; very friable; many fine and few medium roots; few medium pebbles; medium acid; abrupt, smooth boundary.

B21t—8 to 20 inches, olive-brown (2.5Y 4/4) clay; strong, medium, angular blocky structure; very firm, very sticky and very plastic; continuous clay films on faces of peds; few small slickensides; medium acid; gradual, wavy boundary.

B22t—20 to 24 inches, olive-brown (2.5Y 4/4) clay; common, fine, distinct, light olive-gray mottles; weak, medium, subangular blocky structure; very firm, very sticky and very plastic; thin discontinuous clay films on faces of peds; medium acid; gradual, wavy boundary.

B3—24 to 27 inches, olive (5Y 4/3) clay; common, coarse, distinct, olive-brown (2.5Y 4/4) mottles and few, fine, distinct, light olive-gray mottles; weak, medium, subangular blocky structure; very hard, very firm, very sticky and very plastic; slightly acid; gradual, wavy boundary.

C—27 to 57 inches, mottled green, gray, and black weathered rock that crushes to loam; massive; friable; slightly acid.

The solum ranges from 20 to 40 inches in thickness. Depth to hard bedrock is 3 to 6 feet. Brown or black manganese concretions are in part of the profile in many places. The A horizon is 4 to 12 inches thick and is dark grayish brown to olive. The B horizon is 16 to 28 inches thick. The B2t horizon is yellowish-brown to olive-brown clay that has gray mottles in the lower part. The B3 horizon is olive-brown to olive, very firm clay that has gray and brown mottles. The C horizon is mottled brown, green, gray, and black, weathered rock that crushes to loam to clay.

Iredell fine sandy loam, 2 to 6 percent slopes (IrB).—This is a moderately well drained soil on uplands. It is on smooth, broad ridges and in broad, gently sloping areas above the drainageways. Areas range from 5 to 35 acres in size.

Included with this soil in mapping are small areas of Wilkes and Hiwassee soils.

Infiltration is moderate, and surface runoff is medium. A seasonal high water table often delays planting for 1 to 10 days in spring. Unless limed, this soil is medium acid to neutral throughout.

About half the acreage is pastured or cultivated, and the rest is in forest or other uses. This soil is fairly well suited to most locally grown crops. Small grain and corn are the main crops. The hazard of erosion is moderate if this soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slow permeability and high

shrink-swell potential. Capability unit IIe–3; woodland suitability group 4c2.

Louisburg Series

The Louisburg series consists of well-drained to excessively drained, sloping to steep soils of the uplands. These soils formed in residuum that weathered from granite, gneiss, and other acid crystalline rocks.

In a representative profile the surface layer is dark grayish-brown loamy sand about 8 inches thick. The subsoil is yellowish-brown, friable sandy loam about 12 inches thick. Below this layer, and extending to a depth of about 50 inches, is yellowish-red, weathered rock that crushes to coarse loamy sand. Bedrock is at a depth of 50 inches.

The Louisburg soils are low in natural fertility and organic-matter content. Permeability is rapid, and the available water capacity is low. The effective rooting zone is shallow, and the shrink-swell potential is low. Unless limed, these soils are very strongly acid or strongly acid throughout. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage is in forest, and the rest is in pasture. Slope and depth to bedrock are the most important limitations to the use of these soils.

Representative profile of Louisburg loamy sand, 15 to 45 percent slopes, 8 miles southeast of Winston-Salem on U.S. Highway 311 to Union Cross, 0.8 mile west on State Road 2643, 1.6 miles southwest on State Road 2691, 0.5 mile east on State Road 1732, 2,400 feet northeast on pipe line right-of-way, 50 feet north of right-of-way, and 230 feet southwest of a stream:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; coarse sand and fine quartz and feldspar pebbles comprise about 5 percent by volume; strongly acid; abrupt, smooth boundary.

B2—8 to 20 inches, yellowish-brown (10YR 5/6) sandy loam; weak, fine, granular structure; friable; few fine flakes of mica; coarse sand; fine quartz and feldspar pebbles make up less than 10 percent by volume; strongly acid; gradual, wavy boundary.

C—20 to 50 inches, yellowish-red (5YR 4/6) weathered rock that crushes to coarse loamy sand; massive; very friable; common fine flakes of mica; strongly acid.

R—50 inches, bedrock.

The solum ranges from 9 to 22 inches in thickness. Depth to bedrock ranges from 2 to 6 feet or more. The A horizon is 5 to 10 inches thick and is yellowish brown to dark grayish brown. The B horizon ranges from 4 to 12 inches in thickness and is yellowish-red to light yellowish-brown sandy loam. The lower part of the B horizon is discontinuous and is yellowish-red to yellowish-brown clay loam or sandy clay loam 2 to 6 inches thick. The C horizon is red, brown, yellow, or gray, weathered rock that crushes to sandy loam to coarse loamy sand.

Louisburg loamy sand, 6 to 15 percent slopes (LoD).—This is a well-drained to excessively drained soil on uplands. It is on knolls, narrow ridge crests, or upper side slopes in areas that range from 3 to 25 acres in size.

The surface layer is yellowish-brown to dark grayish-brown loamy sand 5 to 10 inches thick. The subsoil is yellowish-red to light yellowish-brown sandy loam 4 to 12 inches thick. In places there is a layer in the lower part of the subsoil that is yellowish-red to yellowish-brown clay loam or sandy clay loam 2 to 6 inches thick.

Included with this soil in mapping are areas of Enon and Wedowee soils. Also included are many small areas where hard rock is at or near the surface.

Infiltration is rapid, and surface runoff is medium. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is forested, and the rest is pastured. Because of slope and shallowness, the soil is poorly suited to cultivation. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope and depth to bedrock. Capability unit VIe–1; woodland suitability group 3o7.

Louisburg loamy sand, 15 to 45 percent slopes (LoF).—This is a well-drained to excessively drained soil on uplands. It is on narrow side slopes adjacent to streams or in broad, irregularly shaped areas that are steep and rough. Areas range from 3 to 80 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of Wedowee and Wilkes soils. Also included are many small areas where hard rock is at or near the surface.

Infiltration is rapid, and surface runoff is rapid. The coarse texture of this soil makes it especially subject to droughtiness and to leaching of plant nutrients. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is in forest, to which the soil is suited. It is fairly easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope and depth to bedrock. Capability unit VIIe–1; woodland suitability group 3r8.

Louisburg-Wedowee complex, 15 to 25 percent slopes (LwE).—This complex consists of Louisburg and Wedowee soils that are in areas so intricately mixed that they cannot be mapped separately. These soils are well drained to excessively drained and are on uplands. They are on the fairly long, lower side slopes adjacent to the streams or in irregularly shaped areas that are steep and broken. Areas range from 5 to 65 acres in size.

About 65 percent of this complex is Louisburg soil and about 25 percent is Wedowee soil. The Louisburg soil has a surface layer of yellowish-brown to dark grayish-brown loamy sand 5 to 10 inches thick. The subsoil is yellowish-red to light yellowish-brown sandy loam that is 4 to 12 inches thick. In places the lower part of the subsoil is yellowish-red to yellowish-brown clay loam or sandy clay loam. The Wedowee soil has a surface layer of yellowish-brown to grayish-brown sandy loam 4 to 10 inches thick. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam 15 to 20 inches thick.

Included with these soils in mapping are areas of similar soils that are more shallow than Wedowee soils or that have a more clayey subsoil than Louisburg soils. Also included are a few areas of Wilkes and Tallapoosa soils.

Infiltration is moderate to moderately slow, and

surface runoff is rapid. Unless limed, these soils are very strongly acid or strongly acid throughout.

Most of the acreage is in forest, to which the soils are suited. These soils are fairly easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This mapping unit has severe limitations for most nonfarm uses because of slope and depth to bedrock. Capability unit VIIe–1; woodland suitability group 3r8.

Madison Series

The Madison series consists of well-drained, gently sloping to steep soils on uplands. These soils formed in residuum that weathered from mica schist and mica gneiss.

In a representative profile the surface layer is reddish-brown fine sandy loam about 6 inches thick. The subsoil, about 28 inches thick, is red, firm clay and clay loam. Below these layers, and extending to a depth of about 58 inches, is mottled red and yellowish-brown, partly weathered mica gneiss and schist that crushes to sandy clay loam.

Madison soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is low. Unless limed, these soils are very strongly acid to medium acid throughout. Depth to the seasonal high water table is more than 5 feet.

About half of the acreage is pastured or cultivated, and the rest is in forest or nonfarm uses. Slope and moderate permeability are the most important limitations to the use of these soils.

Representative profile of Madison fine sandy loam, 6 to 10 percent slopes, 12 miles northeast of Winston-Salem on U.S. Highway 158, 1 mile northwest on State Road 1971, 500 feet north of State Road 1971, and 150 feet east of State Road 1967:

Ap—0 to 6 inches, reddish-brown (5YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few to common fine flakes of mica; few fine quartz and mica schist fragments; slightly acid; abrupt, smooth boundary.

B2t—6 to 28 inches, red (2.5YR 4/6) clay; weak and moderate, medium, subangular blocky structure; firm, sticky and slightly plastic; few fine roots; thin continuous clay films on faces of peds; few medium-sized fragments of gneiss and schist; common fine flakes of mica; medium acid; gradual, irregular boundary.

B3t—28 to 34 inches, red (2.5YR 4/6) clay loam; weak, fine, subangular blocky structure; firm, sticky and slightly plastic; thin patchy clay films on faces of peds; many fine flakes of mica; few medium fragments of weathered and partly weathered mica gneiss and mica schist; medium acid; gradual, irregular boundary.

C—34 to 58 inches, mottled red (2.5YR 4/6) and yellowish-brown (10YR 5/6) partly weathered mica gneiss and schist that crushes to sandy clay loam; massive; friable; slightly sticky; many fine flakes of mica; medium acid.

The solum ranges from 20 to 45 inches in thickness. Depth to bedrock is 3 to 5 feet or more. Mica flakes are throughout the profile. Mica schist and mica gneiss fragments are on the surface and throughout the profile in places. The A horizon is reddish-brown or yellowish-red to dark-brown fine sandy loam or clay loam 3 to 8 inches thick. The B horizon is 17 to 37 inches thick. The B2t horizon is red clay. The B2t horizon is red to yellowish-red clay and clay loam. The C horizon is red to reddish-yellow clay loam to sandy loam that is mottled in many places.

Madison fine sandy loam, 2 to 6 percent slopes (MaB).—This is a well-drained soil on uplands. It is on undulating, fairly narrow ridges in areas that range from 2 to 45 acres in size.

The surface layer is yellowish-brown to dark-brown fine sandy loam 4 to 8 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 20 to 37 inches thick.

Included with this soil in mapping are areas where rock fragments are both on the surface and throughout the soils and a few areas that are darker red in the surface layer and upper part of the subsoil. Also included are areas of Pacolet and Enon soils.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is very strongly acid to medium acid throughout the profile.

Most of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to most locally grown crops. Small grain, corn, tobacco, and soybeans are the main crops. Because of slope, the hazard of erosion is moderate if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate to severe limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIe–1; woodland suitability group 3o7.

Madison fine sandy loam, 6 to 10 percent slopes (MaC).—This is a well-drained soil on uplands. It is on fairly narrow upper side slopes in areas that range from 2 to 40 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas that are darker red in the surface layer and upper part of the subsoil. Also included are a few small areas of Pacolet and Enon soils.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this soil is very strongly acid to medium acid throughout.

About half of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to most locally grown crops. Small grain, corn, tobacco, and soybeans are the main crops. Because of slope, the hazard of erosion is severe if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–1; woodland suitability group 3o7.

Madison fine sandy loam, 10 to 15 percent slopes (MaD).—This is a well-drained soil on uplands. It is on lower side slopes and in irregularly shaped areas on sloping topography. Areas range from 2 to 30 acres in size.

The surface layer is yellowish-brown to brown fine sandy loam 4 to 7 inches thick. The subsoil is red to

yellowish-red clay to sandy clay loam 18 to 35 inches thick.

Included with this soil in mapping are areas of similar soils that are darker red in the surface layer and upper part of the subsoil. Also included are a few areas of Tallapoosa and Wilkes soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is forested or in other uses, and the rest is mostly cultivated or pastured. This soil is well suited to most locally grown crops. Small grain, corn, tobacco, and soybeans are the main crops. Because of slope, the hazard of erosion is very severe if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–1; woodland suitability group 3o7.

Madison fine sandy loam, 15 to 45 percent slopes (MaF).—This is a well-drained soil on uplands. It is on narrow side slopes adjacent to streams or in irregularly shaped areas that are rough and broken. Areas range from 3 to 60 acres in size.

The surface layer is yellowish-brown to brown fine sandy loam 3 to 6 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 17 to 30 inches thick. In places, there is a thin layer of strong-brown or yellowish-red sandy clay loam between the surface layer and the subsoil.

Included with this soil in mapping are areas of similar soils that are darker red in the surface layer and upper part of the subsoil. Also included are areas of Tallapoosa soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is forested, and the rest is mostly in pasture or other nonfarm uses. Because of slope, this soil is poorly suited to cultivation. It is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope and moderate permeability. Capability unit VIe–1; woodland suitability group 3r8.

Madison clay loam, 2 to 6 percent slopes, eroded (McB2).—This is a well-drained soil on uplands. It is on fairly narrow ridges in areas that range from 2 to 45 acres in size.

The surface layer is yellowish-red to dark-brown clay loam 4 to 8 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 18 to 35 inches thick.

Included with this soil in mapping are areas that are darker red in the surface layer and upper part of the subsoil. Also included are a few areas of Pacolet and Enon soils, and small areas where rock fragments are on the surface and throughout the soil.

Infiltration is slow, and surface runoff is medium to rapid. The surface tends to crust after hard rains, and the surface layer clods if worked when wet. Unless it is limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to most locally grown crops. Corn, small grain, and pasture plants are the main crops. Because of slope, the hazard of further erosion is moderate to severe if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–2; woodland suitability group 3o7.

Madison clay loam, 6 to 10 percent slopes, eroded (McC2).—This is a well-drained soil on uplands. It is on fairly narrow upper side slopes in areas that range from 2 to 40 acres in size.

The surface layer is yellowish-red to dark-brown clay loam 4 to 8 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 18 to 35 inches thick.

Included with this soil in mapping are areas of similar soils that are darker red in the surface layer and upper part of the subsoil. Also included are a few gravelly areas and a few areas of Pacolet and Enon soils.

Infiltration is slow, and surface runoff is rapid. The surface tends to crust after hard rains, and the surface layer clods if worked when wet. Unless it is limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is forested or in other uses, and the rest mostly is cultivated and pastured. This soil is well suited to most locally grown crops. Corn, small grain, and pasture plants are the main crops. Because of slope, the hazard of erosion is severe if the soil is used for row crops. Practices are needed that help control runoff and erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe-2; woodland suitability group 3o7.

Madison clay loam, 10 to 15 percent slopes, eroded (McD2).—This is a well-drained soil on uplands. It is on narrow lower side slopes or in irregularly shaped areas. Areas range from 2 to 35 acres in size.

The surface layer is yellowish-red to dark-brown clay loam 4 to 6 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 17 to 26 inches thick.

Included with this soil in mapping are areas of similar soils that are darker red in the surface layer and upper part of the subsoil. Also included are a few gravelly areas and a few areas of Pacolet, Wilkes, and Tallapoosa soils.

Infiltration is slow, and surface runoff is very rapid. The surface tends to crust after hard rains, and the surface layer clods if worked when too wet. Unless it is limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is forested or in other uses, and the rest is mostly cultivated or pastured. This soil is fairly well suited to most locally grown crops. Corn and small grain are the main crops. This soil is well suited to pasture plants. It is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit VIe-2; woodland suitability group 3o7.

Mecklenburg Series, Dark Surface Variant

The Mecklenburg series, dark surface variant, consists of well-drained, gently sloping to strongly sloping soils of the uplands. These soils formed in residuum that weathered from basic rocks.

In a representative profile the surface layer is dark reddish-brown loam about 7 inches thick. The subsoil, about 29 inches thick, is dark-red, firm clay in the upper part and has yellowish-brown mottles. The lower part is red, firm clay loam. Below these layers, and extending to a depth of about 62 inches, is mottled strong-brown and reddish-yellow, weathered rock that crushes to clay loam.

Mecklenburg soils are medium in natural fertility and low in organic-matter content. Permeability is slow, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is high. Unless limed, these soils are slightly acid throughout. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage of these soils is in forest or other nonfarm uses, and the rest is mostly pastured or cultivated. Slope, slow permeability, and high shrink-swell potential are the most important limitations to the use of these soils.

Representative profile of Mecklenburg loam, dark surface variant, 2 to 6 percent slopes, 1 mile west of Clemmons on U.S. Highway 158, 0.2 mile south on State Road 3003, 0.3 mile east on a farm road, 525 feet north of farm road, and 75 feet east of the edge of woods:

Ap—0 to 7 inches, dark reddish-brown (5YR 3/4) loam; strong, medium, granular structure; friable; many fine roots; few fine to medium pores; few fine quartz pebbles; neutral; abrupt, smooth boundary.

B21t—7 to 17 inches, dark-red (2.5YR 3/6) clay; strong, medium, angular blocky structure; firm, very sticky and plastic to very plastic; few fine roots; thin continuous clay films on faces of peds; few, fine to medium, black concretions; slightly acid; gradual, wavy boundary.

B22t—17 to 30 inches, dark-red (2.5YR 3/6) clay; few to common, fine, distinct, yellowish-brown mottles; moderate, medium, subangular blocky structure; firm, very sticky and plastic; few fine roots; thin continuous clay films on faces of peds; few to common, fine, black concretions; slightly acid; gradual, wavy boundary.

B3t—30 to 36 inches, red (2.5YR 4/6) clay loam; weak, medium, subangular blocky structure; firm, sticky and plastic; thin discontinuous clay films on faces of peds; few, ½-inch to 2-inch diameter, reddish-yellow (7.5YR 6/6) fragments of weathered rock; few to common black streaks and concretions; slightly acid; gradual, wavy boundary.

C—36 to 62 inches, mottled strong-brown (7.5YR 5/6) and reddish-yellow (5YR 6/8), weathered rock that crushes to clay loam; few, fine, green specks; massive; common and many, fine and medium, black concretions; slightly acid.

The solum ranges from 20 to 42 inches in thickness. Depth to hard bedrock is more than 4 feet. The A horizon is 3 to 9 inches thick and is dark reddish brown to dark yellowish brown. The B horizon is 17 to 33 inches thick. The B2t horizon is dark-red to yellowish-red clay. The B3t horizon is reddish-brown to strong-brown clay to clay loam and, in places, is mottled with yellowish brown or yellowish red. The C horizon is mottled red, brown, and yellow, weathered rock that crushes to clay loam to sandy loam. Black manganese concretions commonly are throughout the solum.

Mecklenburg soils in Forsyth County dominantly have a moist color value of 3 in the A horizon and upper part of the Bt horizons. This is outside the range as defined for the series but does not alter usefulness or behavior of the soils.

Mecklenburg loam, dark surface variant, 2 to 6 percent slopes (MeB).—This is a well-drained soil on uplands. It is on smooth, broad ridges in fairly broad, irregularly shaped areas that range from 3 to 55 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of Hiwassee and Enon soils and a few small areas that have a surface layer of fine sandy loam.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is slightly acid throughout.

About half of the acreage is cultivated or pastured, and the rest is mostly forested or in nonfarm uses. This soil is well suited to most locally grown crops. Corn, small grain, and soybeans are the main crops. This soil is also well suited to pasture or trees. Because of slope, the hazard of erosion is moderate if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is somewhat difficult to keep in good tilth and can be worked only within a fairly narrow range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope, slow permeability, and high shrink-swell potential. Capability unit IIe-3; woodland suitability group 4o1.

Mecklenburg loam, dark surface variant, 6 to 10 percent slopes (MeC).—This is a well-drained soil on uplands. It is on smooth upper side slopes in areas that range from 3 to 45 acres in size.

The surface layer is dark reddish-brown to dark-brown loam 3 to 9 inches thick. The subsoil is dark-red to strong-brown clay to clay loam 17 to 30 inches thick. The darker red colors are in the upper part of the subsoil.

Included with this soil in mapping are areas of Enon and Hiwassee soils and a few small areas that have a surface layer of fine sandy loam.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this soil is slightly acid throughout.

Most of the acreage is forested or in nonfarm uses, and the rest is mostly cultivated or pastured. This soil is well suited to most locally grown crops. Corn, small grain, and soybeans are the main crops. This soil is also well suited to pasture or trees. Because of slope, the hazard of erosion is severe if the soil is used for row crops. Practices are needed that control runoff and erosion. This soil is somewhat difficult to keep in good tilth and can be worked only within a fairly narrow

range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope, slow permeability, and high shrink-swell potential. Capability unit IIIe–3; woodland suitability group 4o1.

Mecklenburg loam, dark surface variant, 10 to 15 percent slopes (MeD).—This is a well-drained soil on uplands. It is in fairly narrow bands adjacent to drainageways or just above steep side slopes, in areas that range from 3 to 40 acres in size.

The surface layer is dark reddish-brown to brown loam 3 to 9 inches thick. The subsoil is dark-red to strong-brown clay to clay loam 17 to 25 inches thick.

Included with this soil in mapping are a few areas of Hiwassee, Wilkes, and Pacolet soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is slightly acid throughout.

Most of the acreage is in forest or nonfarm uses, and the rest is mostly cultivated or pastured. This soil is fairly well suited to corn and small grain. It is well suited to pasture or trees. Because of slope, the hazard of erosion is very severe if this soil is used for row crops. Practices are needed that help control runoff and erosion. This soil is difficult to keep in good tilth and can be worked only within a fairly narrow range of moisture content. Crops respond fairly well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope, slow permeability, and high shrink-swell potential. Capability unit IVe–3; woodland suitability group 4o1.

Pacolet Series

The Pacolet series consists of well-drained, gently sloping to steep soils of the uplands. These soils formed in residuum that weathered from granite, mica gneiss, schist, and other acidic rocks.

In a representative profile the surface layer is dark yellowish-brown fine sandy loam about 6 inches thick. The subsoil is dominantly red, firm clay and friable clay loam about 26 inches thick. Below these layers, and extending to a depth of about 76 inches, is mottled red and reddish-yellow, weathered mica gneiss that crushes to sandy clay loam.

Pacolet soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is low. Depth to the seasonal high water table is more than 5 feet. Unless limed, these soils are very strongly acid to medium acid throughout.

Most of the acreage is in forest or other nonfarm uses, and the rest is mainly cultivated or pastured. Slope and moderate permeability are the most important limitations to the use of these soils.

Representative profile of Pacolet fine sandy loam, 6 to 10 percent slopes, 2 miles south of Winston-Salem on State Highway 150, 0.3 mile west on State Road 2951, 0.6 mile south of State Road 2951 on private road, and 50 feet south of end of private road:

Ap—0 to 6 inches, dark, yellowish-brown (10YR 4/4) fine sandy loam; weak, medium, granular structure; very friable; many fine roots; few flakes of mica; few small and medium quartz pebbles; neutral; abrupt, smooth boundary.

B1—6 to 9 inches, yellowish-red (5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; common fine and few medium roots; few fine flakes of mica; medium acid; gradual, wavy boundary.

B2t—9 to 25 inches, red (2.5YR 4/6) clay; moderate, medium, subangular blocky structure; firm, sticky and plastic; few fine and medium roots; thin continuous clay films on faces of peds; few fine flakes of mica; medium acid; gradual, irregular boundary.

B3t—25 to 32 inches, red (2.5YR 4/8) clay loam; weak, medium, subangular blocky structure; friable, sticky and slightly plastic; few fine roots; thin discontinuous clay films on faces of peds; few and common fine flakes of mica; few medium pockets of weathered mica gneiss; strongly acid; gradual, wavy boundary.

C—32 to 76 inches, mottled red (2.5YR 4/8) and reddish-yellow (5YR 7/8), weathered mica gneiss that crushes to sandy clay loam; massive; friable; strongly acid.

The solum ranges from 20 to 40 inches in thickness. Depth to hard bedrock is more than 4 feet. The A horizon is brown, grayish brown, dark yellowish brown, yellowish brown, yellowish red, or reddish brown. It is fine sandy loam or clay loam 3 to 9 inches thick. The B horizon is 17 to 31 inches thick. The B1 horizon is yellowish-red to strong-brown sandy clay loam or clay loam. The B2t horizon is red clay loam, clay, or sandy clay, but in a few profiles the lower part of the B2t horizon is mottled with yellow or brown. The B3t horizon is red or yellowish-red clay loam or sandy clay loam, but in some places it is mottled with brown or yellow. The C horizon is mottled red, yellow, and brown, weathered rock that crushes to clay loam to sandy loam.

Pacolet fine sandy loam, 2 to 6 percent slopes (PaB).—This is a well-drained soil on uplands. It is on long, fairly broad ridges in areas that range from 3 to 65 acres in size.

The surface layer is yellowish-brown to grayish-brown fine sandy loam 5 to 9 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 22 to 30 inches thick. In some places the lower part of the subsoil is mottled with yellow and brown.

Included with this soil in mapping are areas of Madison, Cecil, and Vance soils.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is pastured or cultivated, and the rest is in forest or in nonfarm uses. This soil is well suited to all locally grown crops, pasture, and hay plants. Because of slope, the hazard of erosion is moderate if the soil is cultivated. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of lime and fertilizer. This soil has moderate limitations for nonfarm uses because of slope and moderate permeability. Capability unit IIe–1; woodland suitability group 3o7.

Pacolet fine sandy loam, 6 to 10 percent slopes (PaC).—This is a well-drained soil on uplands. It is on long, fairly narrow, upper side slopes in areas that range from 3 to 50 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of Madison, Wilkes, and Vance soils.

Infiltration is moderate, and surface runoff is rapid.

Unless limed, this soil is very strongly acid to medium acid throughout.

About half the acreage is pastured or cultivated, and the rest is forested or in nonfarm uses. This soil is well suited to all locally grown crops, pasture, and hay plants. The hazard of erosion is severe because of slope, and if the soil is cultivated, practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–1; woodland suitability group 3o7.

Pacolet fine sandy loam, 10 to 15 percent slopes (PaD).—This is a well-drained soil on uplands. It is on long, fairly narrow, lower side slopes in areas that range from 3 to 40 acres in size.

The surface layer is yellowish-brown to grayish-brown fine sandy loam 4 to 8 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 20 to 30 inches thick. In some places the lower part of the subsoil is mottled with yellow and brown.

Included with this soil in mapping are areas of Madison, Wilkes, and Louisburg soils. Also included are a few areas of soils that have a surface layer of clay loam.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is in forest or nonfarm uses, and the rest is chiefly cultivated or pastured. This soil is well suited to all locally grown crops, pasture, and hay. If the soil is cultivated, the hazard of erosion is very severe and practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capabilty unit IVe–1; woodland suitability group 3o7.

Pacolet fine sandy loam, 15 to 45 percent slopes (PaF).—This soil is well drained. It is in rough upland terrain on long, fairly narrow, lower side slopes. The areas are irregularly shaped and range from 3 to 60 acres in size.

The surface layer is yellowish-brown to grayish-brown fine sandy loam 3 to 7 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 17 to 25 inches thick. In some places the lower part of the subsoil is mottled with yellow and brown.

Included with this soil in mapping are areas of Madison and Tallapoosa soils and a few small areas of Wilkes and Louisburg soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is in forest, and the rest is chiefly pastured. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope. Capability unit VIe–1; woodland suitability group 3r8.

Pacolet clay loam, 2 to 6 percent slopes, eroded (PcB2).—This is a well-drained soil on uplands. It is on long, fairly narrow ridges in areas that range from 2 to 45 acres in size.

The surface layer is yellowish-red to reddish-brown clay loam 4 to 7 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 20 to 28 inches thick. In some places the lower part of the subsoil is mottled with yellow and brown.

Included with this soil in mapping are some areas of Madison and Vance soils and a few areas of soils that have a surface layer of sandy loam.

Infiltration is slow and surface runoff is medium. This soil tends to crust after a hard rain and clods if worked when too wet. Unless limed, it is very strongly acid to medium acid throughout.

Most of the acreage is pastured or cultivated, and the rest is forested or in nonfarm uses. This soil is fairly well suited to most locally grown crops and pasture plants. Because of slope, the hazard of further erosion is moderate if this soil is cultivated. Practices are needed that control runoff and erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–2; woodland suitability group 3o7.

Pacolet clay loam, 6 to 10 percent slopes, eroded (PcC2).—This soil is well drained. It is on fairly narrow, upper side slopes on uplands. The mapped areas are irregular in shape and range from 2 to 45 acres in size.

The surface layer is yellowish-red to reddish-brown clay loam 4 to 7 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 18 to 28 inches thick.

Included with this soil in mapping are some areas of Madison, Wilkes, and Louisburg soils. Also included are a few small areas of soils that have a surface layer of sandy loam.

Infiltration is slow, and surface runoff is rapid. The surface tends to crust after hard rains, and the surface layer clods if worked when too wet. Unless it is limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is in forest or other nonfarm uses, and the rest is chiefly cultivated or pastured. This soil is fairly well suited to corn, small grain, and pasture plants. Because of slope, the hazard of erosion is severe if the soil is used for row crops. Practices are needed that help control runoff and further erosion. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–2; woodland suitability group 3o7.

Pacolet clay loam, 6 to 10 percent slopes, severely eroded (PcC3).—This well-drained soil is on uplands. It is on fairly narrow upper side slopes and in irregularly shaped areas 2 to 30 acres in size. Normally, there are 1 to 4 gullies per acre, and these are 1 to 7 feet deep.

The surface layer is yellowish-red to reddish-brown

clay loam 3 to 6 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 18 to 23 inches thick.

Included with this soil in mapping are some areas of Madison, Wilkes, and Louisburg soils. Also included are a few small areas of soils that have a surface layer of sandy loam.

Infiltration is slow, and surface runoff is rapid. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is forested or pastured. This soil is poorly suited to cultivation. It is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate to severe limitations for most nonfarm uses because of slope and moderate permeability. Capability unit VIe–2; woodland suitability group 4c2e.

Pacolet clay loam, 10 to 15 percent slopes, eroded (PcD2).—This well-drained soil is on uplands. It is on narrow lower side slopes and in irregularly shaped areas 2 to 40 acres in size.

The surface layer is yellowish-red to reddish-brown clay loam 3 to 6 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 17 to 25 inches thick.

Included with this soil in mapping are areas of Madison, Tallapoosa, and Wilkes soils.

Infiltration is slow, and surface runoff is very rapid. The surface tends to crust after hard rains, and the surface layer clods if it is worked when too wet. Unless it is limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is in forest, and the rest is chiefly in pasture. This soil is poorly suited to cultivated crops, but it is well suited to pasture. It is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit VIe–2; woodland suitability group 3o7.

Pacolet clay loam, 15 to 45 percent slopes, eroded (PcF2).—This well-drained soil is on uplands. It is on long, narrow lower side slopes and in rough, irregularly shaped areas 3 to 55 acres in size.

The surface layer is yellowish-red to reddish-brown clay loam 3 to 6 inches thick. The subsoil is red to yellowish-red clay to sandy clay loam 17 to 22 inches thick.

Included with this soil in mapping are areas of Madison, Tallapoosa, Wilkes, and Louisburg soils.

Infiltration is slow, and surface runoff is very rapid. Unless it is limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is in forest, and the rest is chiefly in pasture. This soil is not suitable for cultivation. It is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope and moderate permeability. Capability unit VIIe–1; woodland suitability group 3r8.

Pacolet complex, 10 to 25 percent slopes, severely eroded (PeE3).—This mapping unit is an intricate mixture of well-drained Pacolet soils and gullied areas on uplands. It occurs on long, narrow lower side slopes and in rough, irregularly shaped areas 3 to 50 acres in size.

About 85 percent of the mapping unit is Pacolet soils that have a normal soil profile, and about 25 percent is gullied. Typically, this complex has three to nine gullies per acre, and these are 2 to 12 feet deep. The soils between the gullies have a surface layer of yellowish-red to reddish-brown clay loam and a subsoil of red to yellowish-red clay to clay loam.

Included with this unit in mapping are areas of Madison and Tallapoosa soils and a few areas of Wilkes and Louisburg soils. Also included are a few small areas between the gullies where the soils have a surface layer of sandy loam.

Infiltration is slow, and surface runoff is very rapid. Unless they are limed, these soils are very strongly acid to medium acid throughout.

Most of the acreage is in forest or is idle. Because of slope, severe erosion, and gullies, these soils are not suitable for cultivation. They are difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crops respond well to applications of fertilizer and lime. These soils have severe limitations for most nonfarm uses because of slope and gullies. Capability unit VIIe–2; woodland suitability group 4c3e.

Pacolet-Urban land complex, 2 to 10 percent slopes (PuC).—This mapping unit consists of areas where Pacolet soils have been altered in many places by the construction of buildings, streets, and parking lots and by other urban development, mainly within the city of Winston-Salem. The extent of soil disturbance in this unit ranges from none to total. In areas where the disturbance has been total, the resulting soil material does not resemble the original soil in appearance, use, or response to treatment. Alteration to Urban land is done mainly in preparing the sites for roads and buildings, mainly on the ridges and upper side slopes. In some places the slope has been modified, but the overall slope ranges from 2 to 10 percent.

About 45 percent of the mapping unit is Pacolet soils, and about 40 percent is Urban land. The proportion of Urban land is highest in the downtown business district.

Included with this complex in mapping are areas of Cecil, Madison, and Hiwassee soils and a few areas of Wilkes and Enon soils. Also included are a few small areas where the slope is more than 10 percent.

Runoff is rapid from this complex because a large amount of water runs off buildings, roads, and parking lots. Not in a capability unit or a woodland suitability group.

Pacolet-Urban land complex, 10 to 25 percent slopes (PuE).—This complex consists of areas where Pacolet soils have been altered in many places by the construction of buildings, streets, and parking lots and by other developments, mainly within the city of Winston-Salem. The extent of soil disturbance in this unit ranges from none to total. In areas where the disturbance has been total, the resulting soil material does not resemble the original soil in appearance, use, or response to treatment. The soil is altered mainly in

preparing the sites for roads and buildings, mainly on the lower side slopes adjacent to drainageways. In some places the slope has been modified, but the overall slope ranges from 10 to 25 percent.

About 50 percent of this mapping unit is Pacolet soils, and about 35 percent is Urban land. The proportion of Urban land is higher in the downtown business district and lower in residential areas.

Included with this unit in mapping are areas of Tallapoosa, Hiwassee, Madison, and Louisburg soils. Also included are a few small areas of Wilkes soils and a few areas that are steeper.

Runoff is rapid because a large amount of water runs off buildings, roads, and parking lots. Not in a capability unit or a woodland suitability group.

Tallapoosa Series

The Tallapoosa series consists of well-drained, sloping to steep soils of the uplands. These soils formed in residuum that weathered from quartz mica schist and mica gneiss.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 8 inches thick. The subsoil, about 11 inches thick, is dominantly yellowish-red, friable fine sandy clay loam. Below these layers, and extending to a depth of about 32 inches, is mottled red and brown, weathered rock that crushes to sandy loam.

Tallapoosa soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is low. The effective rooting zone is shallow, and the shrink-swell potential is low. Unless limed, these soils are very strongly acid or strongly acid throughout. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage is in forest. Slope and depth to bedrock are the most important limitations to the use of these soils.

Representative profile of Tallapoosa fine sandy loam, 15 to 45 percent slopes, 15 miles northeast of Winston-Salem on U.S. Highway 158, 0.4 mile north on State Road 1962, 300 feet south of homesite in pasture:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, medium, granular structure; very friable; many fine and medium roots; common fine flakes of mica; few, small, quartz mica schist pebbles; strongly acid; clear, wavy boundary.

B1—8 to 11 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, medium, granular structure; friable; common fine roots; common fine flakes of mica; few small quartz mica schist pebbles; strongly acid; clear, wavy boundary.

B2t—11 to 16 inches, yellowish-red (5YR 4/6) fine sandy clay loam; weak, medium, subangular blocky structure; friable, slightly sticky; many medium flakes of mica; few fine roots; thin discontinuous clay films on faces of peds; few to common soft quartz mica schist pebbles ¼ to 1 inch in size; strongly acid; gradual, wavy boundary.

B3—16 to 19 inches, brown (7.5YR 5/4) sandy loam; weak, fine, subangular blocky structure; friable; many quartz mica schist pebbles; many flakes of mica; strongly acid; clear, wavy boundary.

C—19 to 32 inches, mottled red (2.5YR 4/8) and brown (7.5YR 5/4) weathered rock that crushes to sandy loam; massive; friable; common fragments of hard rock; strongly acid; irregular boundary.

R—32 inches, bedrock.

The solum ranges from 6 to 20 inches in thickness. Depth to bedrock is 1 to more than 5 feet. Mica flakes are throughout the profile and normally are in sufficient quantity in the B and C horizons to give a slick feeling. Quartz mica schist and mica gneiss pebbles are on the surface and throughout the profile in places. The A horizon is 3 to 9 inches thick and is reddish-brown to dark grayish-brown loam or fine sandy loam. The B horizon is 3 to 11 inches thick. The B1 horizon, if present, is strong-brown to yellowish-brown loam to fine sandy loam. The B2t horizon is yellowish-red to strong-brown clay loam to loam. The B3 horizon is yellowish-red to brown sandy clay loam or sandy loam. The C horizon is mottled red, brown, and yellow, weathered rock that crushes to silt loam, loam, or sandy loam. Narrow tongues of the B2 horizon extend into the B3 or C horizons in places.

Tallapoosa fine sandy loam, 6 to 15 percent slopes (TaD).—This is a well-drained soil on uplands. It is on fairly narrow ridges or upper slopes in areas that range from 2 to 35 acres in size.

The surface layer is reddish-brown to dark grayish-brown fine sandy loam 3 to 9 inches thick. The subsoil is red to yellowish-brown clay loam to sandy loam 3 to 11 inches thick. In places, there is a thin layer of strong-brown or yellowish-brown loam to fine sandy loam between the surface layer and the subsoil. Mica flakes are present in the surface layer and the subsoil and are commonly in sufficient quantity in the subsoil to give a slick feeling. In places, fragments of rock are on the surface and throughout the soil.

Included with this soil in mapping are a few areas of Louisburg, Madison, and Wilkes soils. Also included are a few small areas that have no subsoil development. A few rock outcrops are scattered throughout areas of this soil.

Infiltration is moderate, and surface runoff is rapid. Unless it is limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is forested, and the rest is mostly pastured or cultivated. This soil is fairly well suited to most locally grown crops. If it is cultivated, however, practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and depth to bedrock. Capability unit VIe–1; woodland suitability group 4o1.

Tallapoosa fine sandy loam, 15 to 45 percent slopes (TaF).—This is a well-drained soil on uplands. It is on narrow side slopes adjacent to streams or in steep, broken, irregularly shaped areas. Areas range from 2 to 90 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of Louisburg soils and areas of soils that have no subsoil development. Also included are a few small areas of Madison and Wilkes soils and scattered rock outcroppings and boulders.

Infiltration is moderate, and surface runoff is rapid.

Most of the acreage is forested, and the rest is in pasture, to which the soil is well suited. If it is used for pasture, however, it is subject to severe erosion. Practices are needed that control runoff and erosion. This soil has severe limitations for most nonfarm uses because of slope and depth to bedrock. Capability unit VIIe–1; woodland suitability group 4r2.

Urban Land

Urban land consists of areas where soils have been severely altered by urban development. This land is in areas that are covered by buildings, roads, and parking lots or in areas where the soil has been so altered that it no longer resembles the original soil. It is in small areas, generally less than one-half acre in size.

This land type is so closely intermingled with small areas of soils of the Pacolet series that they cannot be mapped separately. It is mapped only in complexes with Pacolet soils. The land is so variable that an on-site examination is necessary to determine treatment or possible use.

Vance Series

The Vance series consists of well-drained, gently sloping to strongly sloping soils of the uplands. These soils formed in residuum that weathered from granite, gneiss, and other acidic rock.

In a representative profile the surface layer is brown sandy loam about 7 inches thick. The subsoil is about 35 inches thick. The upper part of the subsoil is yellowish-brown and strong-brown, very firm clay that has red mottles. The lower part is yellowish-brown, firm sandy clay that has red and dark grayish-brown mottles. Below these layers, and extending to a depth of about 62 inches, is mottled red, brownish-yellow, and yellow, weathered rock that crushes to sandy clay loam.

Vance soils are medium in natural fertility and low in organic-matter content. Permeability is slow, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is moderate. Unless limed, these soils are very strongly acid or strongly acid throughout. Depth to the seasonal high water table is more than 5 feet.

These soils are relatively unimportant in farming. About half of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. Slope, slow permeability, and moderate shrink-swell potential are the most important limitations to the use of these soils.

Representative profile of Vance sandy loam, 2 to 6 percent slopes, 1 mile northeast of Kernersville, on State Highway 150, and 1,350 feet north of this highway behind homesite at end of a field road:

Ap—0 to 7 inches, brown (10YR 5/3) sandy loam; weak, medium, granular structure; friable; many fine roots; medium acid; abrupt, smooth boundary.

B21t—7 to 13 inches, yellowish-brown (10YR 5/8) clay; few, fine, distinct, red mottles; moderate, medium, subangular blocky structure; very firm, very sticky and very plastic; thin continuous clay films on faces of peds; strongly acid; gradual, wavy boundary.

B22t—13 to 32 inches, strong-brown (7.5YR 5/6) clay; common, fine and medium, distinct, red (2.5YR 4/8) mottles; moderate, medium, angular blocky structure; very firm, very sticky and very plastic; few fine flakes of mica; continuous clay films on faces of peds; strongly acid.

B3t—32 to 42 inches, yellowish-brown (10YR 5/6) sandy clay; few, fine, distinct, red mottles; few fine and medium mottles or streaks of dark grayish brown (10YR 4/2); weak, fine, subangular blocky structure; firm, very sticky and plastic; few, thin, discontinuous clay films on faces of peds; few fine flakes of mica; strongly acid; gradual, wavy boundary.

C—42 to 62 inches, mottled red (2.5YR 5/6), brownish-yellow (10YR 6/6), and yellow (5Y 7/6), weathered rock that crushes to sandy clay loam; massive; friable; many flakes of mica; strongly acid.

The solum ranges from 25 to 45 inches in thickness. Depth to hard bedrock is more than 4 feet. The A horizon is 4 to 10 inches thick and is yellowish brown, brown, or grayish brown. The B horizon ranges from 21 to 35 inches in thickness. The B2t horizon is yellowish-red to brownish-yellow clay to sandy clay, and is commonly mottled with red, yellow, or brown. The B3t horizon is yellowish-red to yellowish-brown clay to sandy clay loam that has mottles and streaks of red, yellow, or brown. In places it has gray mottles at a depth of 30 inches or more. The C horizon is mottled red, brown, and yellow weathered rock that crushes to sandy clay loam or sandy loam. It has gray mottles in many places.

Vance sandy loam, 2 to 6 percent slopes (VaB).—This is a well-drained soil on uplands. It is on smooth ridges in areas that range from 3 to 40 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of a similar soil but that has gray mottles within a depth of 30 inches. Also included are a few small areas of Wedowee and Appling soils.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is mostly in forest or other uses. This soil is well suited to most locally grown crops and pasture plants. Corn, soybeans, tobacco, and small grain are the main crops. Because of slope, the hazard of erosion is moderate if the soil is used for crops. Practices are needed that control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope, slow permeability, and moderate shrink-swell potential. Capability unit IIe–3; woodland suitability group 3o7.

Vance sandy loam, 6 to 10 percent slopes (VaC).—This is a well-drained soil on uplands. It is on fairly narrow, upper side slopes in areas that are 3 to 30 acres in size.

The surface layer is yellowish-brown to grayish-brown sandy loam 4 to 9 inches thick. In a few places, there is a thin layer of yellowish-brown or brownish-yellow clay loam or sandy clay between the surface layer and subsoil. The subsoil is 21 to 32 inches thick. It is yellowish-red to brownish-yellow clay to sandy clay loam mottled with red, yellow, and brown. In places, there are gray mottles at a depth of 30 inches or more.

Included with this soil in mapping are areas of a similar soil but that has gray mottles within a depth of 30 inches. Also included are a few small areas of Wedowee and Appling soils.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this soil is very strongly acid or strongly acid throughout.

About half of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to most locally grown crops and pasture plants. Corn, soybeans, tobacco, and small grain are the main

crops. Because of slope, the hazard of erosion is severe if this soil is used for crops. Practices are needed that control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope, slow permeability, and moderate shrink-swell potential. Capability unit IIIe–3; woodland suitability group 3o7.

Vance sandy loam, 10 to 15 percent slopes (VaD).—This is a well-drained soil on uplands. It is on fairly narrow, lower side slopes that are generally adjacent to drainageways.

The surface layer is yellowish-brown to grayish-brown sandy loam 4 to 7 inches thick. The subsoil is yellowish-red to brownish-yellow clay to sandy clay loam that is mottled with red, yellow, and brown and is 21 to 28 inches thick.

Included with this soil in mapping are areas of similar soils but that have gray mottles within a depth of 30 inches. Also included are a few small areas of Wedowee and Wilkes soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is in forest or other nonfarm uses, and the rest mostly is cultivated or pastured. This soil is fairly well suited to most locally grown crops and pasture plants. Corn, pasture, tobacco, and small grain are the main crops. Because of slope, the hazard of erosion is very severe if the soil is used for crops. Practices are needed that help to control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has severe limitations for most nonfarm uses because of slope, slow permeability, and moderate shrink-swell potential. Capability unit IVe–3; woodland suitability group 3o7.

Wedowee Series

The Wedowee series consists of well-drained, gently sloping to strongly sloping soils of the uplands. These soils formed in residuum that weathered from granite, gneiss, and other acidic rock.

In a representative profile the surface layer is brown sandy loam about 7 inches thick. The subsoil is about 27 inches thick. The upper part of the subsoil is yellowish-brown, friable sandy clay loam, and the lower part is strong-brown, firm sandy clay and friable sandy clay loam that has yellowish-red, red, and brownish-yellow mottles. Below these layers, and extending to a depth of about 56 inches, is mottled yellowish-red, red, and brownish-yellow, weathered rock that crushes to coarse sandy loam.

Wedowee soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is moderately deep, and the shrink-swell potential is low. Unless limed, these soils are very strongly acid or strongly acid throughout. Depth to the seasonal high water table is more than 5 feet.

About half the acreage of Wedowee soils is cultivated or pastured, and the rest is in forest or nonfarm use. Slope and moderate permeability are the most important limitations to the use of these soils.

Representative profile of Wedowee sandy loam, 6 to 10 percent slopes, 7 miles southeast of Winston-Salem, on State Highway 109, 0.3 mile northeast on State Road 2692, 925 feet northwest of State Road 2692, and 125 feet south of edge of woodland:

Ap—0 to 7 inches, brown (10YR 5/3) sandy loam; moderate, medium, granular structure; friable; many fine roots; medium acid; abrupt, smooth boundary.

B1t—7 to 11 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, fine, subangular blocky structure; friable; slightly sticky; few fine roots; strongly acid; gradual, wavy boundary.

B2t—11 to 27 inches, strong-brown (7.5YR 5/8) sandy clay; common, fine and medium, yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; thin distinct clay films on faces of peds; strongly acid; gradual, wavy boundary.

B3—27 to 34 inches, strong-brown (7.5YR 5/8) sandy clay loam; common, medium, streaks of red (2.5YR 4/8) and brownish yellow (10YR 6/8); weak, medium, subangular blocky structure; friable, sticky and slightly plastic; strongly acid; gradual, wavy boundary.

C—34 to 56 inches, mottled yellowish-red (5YR 5/8), red (2.5YR 4/8), and brownish-yellow (10YR 6/8), weathered rock that crushes to coarse sandy loam; massive; friable; few fine flakes of mica; strongly acid.

The solum ranges from 20 to 40 inches in thickness. Depth to hard bedrock is more than 4 feet. Mica flakes may be present in any horizon. The A horizon is 5 to 12 inches thick and is yellowish brown or brown to dark grayish brown. The B horizon is 15 to 28 inches thick. The B1t horizon, if present, is strong-brown to yellowish-brown clay loam to sandy clay loam. The B2t horizon is yellowish-red to strong-brown clay or sandy clay commonly mottled with red, yellow, or brown. The B3 horizon is red to yellowish-brown clay loam or sandy clay loam that has mottles and streaks of red, yellow, or brown. The C horizon is weathered granite or gneiss that crushes to sandy loam, loam, or clay loam commonly mottled and streaked with red, brown, and yellow. In some profiles this horizon has gray mottles.

Wedowee sandy loam, 2 to 6 percent slopes (WdB).—This is a well-drained soil on uplands. It is on smooth ridges in fairly broad, irregularly shaped areas that range from 3 to 40 acres in size.

The surface layer is yellowish-brown to dark grayish-brown sandy loam 5 to 12 inches thick. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam 15 to 28 inches thick. In most places the lower part of the subsoil has red, yellow, or brown mottles.

Included with this soil in mapping are areas of Appling, Vance, Louisburg, and other well-drained to somewhat poorly drained soils in small drainageways and depressions.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to all locally grown crops and pasture plants. Corn, soybeans, tobacco, and small grain are the main crops. Because of slope, the hazard of erosion is moderate if the soil is used for crops. Practices are needed that control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate

limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIe–1; woodland suitability group 3o7.

Wedowee sandy loam, 6 to 10 percent slopes (WdC).—This is a well-drained soil on uplands. It is on the fairly long, upper side slopes in areas that range from 3 to 25 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of Louisburg, Enon, and Vance soils and a few areas of similar soils that have a surface layer of sandy clay loam.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or other uses. This soil is well suited to most locally grown crops. Small grain, tobacco, and corn are the main crops. Because of slope, the hazard of erosion is severe if the soil is cultivated. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IIIe–1; woodland suitability group 3o7.

Wedowee sandy loam, 10 to 15 percent slopes (WdD).—This is a well-drained soil on uplands. It is on the fairly long, lower side slopes adjacent to streams. The areas range from 3 to 20 acres in size.

The surface layer is yellowish-brown to grayish-brown sandy loam 5 to 8 inches thick. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam that is mottled with red, brown, and yellow and is 15 to 20 inches thick.

Included with this soil in mapping are a few areas of Louisburg and Vance soils and a few areas of similar soils that have a surface layer of sandy clay loam.

Infiltration is moderately slow, and surface runoff is very rapid. Unless limed, this soil is very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is mostly in forest or other uses. This soil is fairly well suited to most locally grown crops. Small grain, tobacco, and corn are the main crops. Because of slope, the hazard of erosion is very severe if the soil is cultivated. Practices are needed that control runoff and erosion. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope and moderate permeability. Capability unit IVe–1; woodland suitability group 3o7.

Wedowee-Louisburg complex, 2 to 6 percent slopes (WeB).—This mapping unit consists of well-drained to excessively drained soils on uplands. These soils are on irregularly shaped ridges in areas that range from 3 to 45 acres in size.

This complex consists of Wedowee and Louisburg soils that are in areas so intricately mixed that they cannot be mapped separately. About 65 percent of the mapping unit is Wedowee soil, and about 25 percent is Louisburg soil.

The Wedowee soil has a surface layer of yellowish-brown to grayish-brown sandy loam 5 to 12 inches thick. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam 15 to 28 inches thick. The Louisburg soil has a surface layer of yellowish-brown to dark grayish-brown loamy sand 5 to 10 inches thick. The subsoil is yellowish-red to light yellowish-brown sandy loam 4 to 12 inches thick.

Included with these soils in mapping are areas of similar soils that are more shallow or that have a more clayey subsoil. Also included are a few areas of Vance soils and Pacolet soils.

Infiltration is moderate, and surface runoff is medium. Unless they are limed, the soils of this complex are very strongly acid or strongly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or other uses. These soils are fairly well suited to most locally grown crops. Small grain, tobacco, and corn are the main crops. The hazard of erosion is moderate if these soils are cultivated, and practices are needed that help control runoff and erosion. These soils are easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. These soils are so variable that onsite investigation is necessary to determine the degree of limitation to the use of the soils for nonfarm purposes. Capability unit IIIe–1; woodland suitability group 3o7.

Wedowee-Louisburg complex, 6 to 10 percent slopes (WeC).—This mapping unit consists of well-drained and excessively drained soils on uplands. These soils are on the fairly long, lower side slopes adjacent to the streams, or above steep slopes. The areas range from 3 to 25 acres in size.

This complex is made up of Wedowee and Louisburg soils that are in areas so intricately mixed that they cannot be mapped separately. About 55 percent of the mapping unit is Wedowee soil, and about 30 percent is Louisburg soil.

The Wedowee soil has a surface layer of yellowish-brown to grayish-brown sandy loam 5 to 8 inches thick. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam 15 to 20 inches thick. The Louisburg soil has a surface layer of yellowish-brown to dark grayish-brown loamy sand 5 to 10 inches thick. The subsoil is yellowish-red to light yellowish-brown sandy loam 4 to 12 inches thick.

Included with this unit in mapping are areas of similar soils that are more shallow and that have a more clayey subsoil than the Louisburg soil. Also included are a few areas of Vance and Pacolet soils.

Infiltration is moderate, and surface runoff is rapid. Unless they are limed, the soils of this complex are very strongly acid or strongly acid throughout.

Most of the acreage is in forest or other uses, and the rest is mostly cultivated or pastured. These soils are fairly well suited to most locally grown crops. Small grain, tobacco, and corn are the main crops. Because of slope, the hazard of erosion is severe if the soils are cultivated. Practices are needed that control runoff and erosion. These soils are easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. Onsite investigation is necessary to determine the degree of limitations for nonfarm use

of these soils. Capability unit IVe–1; woodland suitability group 3o7.

Wedowee-Louisburg complex, 10 to 15 percent slopes (WeD).—This mapping unit consists of well-drained to excessively drained soils on uplands. These soils are on the fairly long, lower side slopes adjacent to the streams, or above steep slopes. The areas range from 3 to 20 acres in size.

This complex is made up of Wedowee and Louisburg soils that are in areas so intricately mixed that they cannot be mapped separately. About 45 percent of the mapping unit is Wedowee soil, and about 40 percent is Louisburg soil.

The Wedowee soil has a surface layer of yellowish-brown to grayish-brown sandy loam 5 to 8 inches thick. The subsoil is yellowish-red to yellowish-brown clay to sandy clay loam 15 to 20 inches thick. The Louisburg soil has a surface layer of yellowish-brown to dark grayish-brown loamy sand 5 to 10 inches thick. The subsoil is yellowish-red to light yellowish-brown sandy loam 4 to 12 inches thick.

Included with this unit in mapping are areas of similar soils that are more shallow, are more coarse textured, or that have a more clayey subsoil. Also included are a few areas of Wilkes and Pacolet soils.

Infiltration is moderate, and surface runoff is rapid. Unless they are limed, the soils of this complex are very strongly acid or strongly acid throughout.

Most of the acreage is in forest or other uses, and the rest is mainly cultivated or pastured. These soils are fairly well suited to most locally grown crops. Small grain, tobacco, corn, and pasture plants are the main crops. The soils are better suited to pasture or trees than to most other uses. Because of slope, the hazard of erosion is severe if the soils are cultivated. Practices are needed that control runoff and erosion. These soils are easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. Onsite investigation is needed to determine the degree of limitations for nonfarm use of these soils. Capability unit VIe–1; woodland suitability group 3o7.

Wehadkee Series

The Wehadkee series consists of nearly level, poorly drained soils on the stream flood plains. These soils formed in recent alluvial deposits.

In a representative profile the surface layer is brown loam about 9 inches thick. The subsoil is about 33 inches thick. The upper part of the subsoil is dominantly gray, friable sandy clay loam that has yellowish-brown mottles. The lower part is light olive-gray, friable fine sandy loam that has yellowish-brown mottles. Below these layers, and extending to a depth of about 61 inches, is light olive-gray, stratified loamy sand, sandy loam, and sandy clay that has light yellowish-brown mottles.

Wehadkee soils are low in natural fertility and low to medium in organic-matter content. Permeability is moderate, and the available water capacity is medium. The shrink-swell potential is low. These soils flood very frequently for very brief periods of time. Unless limed, these soils are medium acid or slightly acid throughout. The seasonal high water table is at the surface for 2 to 6 months annually.

Most of the acreage is in forest or native hay. Very frequent flooding and a seasonal high water table are the most important limitations to the use of these soils.

Representative profile of Wehadkee loam in an area of Wehadkee soils, 2 miles north of Winston-Salem on Cherry Street Extension, or old U.S. Highway 52, 150 feet east of U.S. Highway 52, and 125 feet south of Leak Fork Creek:

Ap—0 to 9 inches, brown (10YR 4/3) loam; common, fine, faint, light olive-brown mottles; moderate, medium, granular structure; friable; many fine roots; slightly acid; clear, smooth boundary.

B1g—9 to 13 inches, light brownish-gray (2.5Y 6/2) loam; few, fine, distinct, yellowish-brown mottles; moderate, medium, granular structure; friable; few fine roots; slightly acid; gradual, wavy boundary.

B21g—13 to 32 inches, gray (5Y 6/1) sandy clay loam; many, fine, distinct, yellowish-brown mottles; weak, fine, subangular blocky structure; friable, sticky; few medium black concretions; few fine flakes of mica; medium acid; gradual, wavy boundary.

B22g—32 to 42 inches, light olive-gray (5Y 6/2) fine sandy loam; few, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, granular structure; friable; common fine flakes of mica; medium acid; gradual, wavy boundary.

Cg—42 to 61 inches, light olive-gray (5Y 6/2) stratified loamy sand, sandy loam, and sandy clay; few, medium, light yellowish-brown (2.5Y 6/4) mottles; common fine flakes of mica; slightly acid.

The solum ranges from 37 to 60 inches in thickness. Depth to bedrock is more than 5 feet. The A horizon is brown to dark grayish-brown fine sandy loam, loam, or silt loam that is 7 to 13 inches thick and that has light olive-brown mottles in places. The B horizon is 30 to 47 inches thick. The B1g horizon is light brownish-gray or grayish-brown loam or sandy loam. The B2g horizon is gray, dark-gray, or light olive-gray sandy clay loam, clay loam, or fine sandy loam that has yellowish-brown to reddish-brown mottles. The Cg horizon is light olive-gray to gray, stratified clay, sandy clay, sandy clay loam, sandy loam, and loamy sand that has brown mottles. In some places this horizon contains water-rounded gravel.

Wehadkee soils (Wh).—These are poorly drained soils on stream flood plains, in long bands that are 150 to 600 feet wide and 3 to 75 acres in size. In places along the smaller streams, the bands reach a mile in length. Slopes range from 0 to 2 percent.

Included with these soils in mapping, along small streams and drainageways, are areas of similar soils that have a less developed subsoil. Also included are areas of Chewacla soils and some small areas of similar soils that have a better developed, more clayey subsoil.

Infiltration is moderate, and surface runoff is slow. These soils are subject to very frequent flooding for very brief periods of time. Unless they are limed, the soils are medium acid or slightly acid throughout.

Most of the acreage is in forest or native grasses. These soils are well suited to pasture and water-tolerant trees (fig. 5). They are fairly easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. These soils have severe limitations for most nonfarm uses because of very frequent flooding and the seasonal high water table. Capability unit IVw–1; woodland suitability group 1w9.

Figure 5.—Red maple and other water-tolerant hardwoods growing on Wehadkee soils.

Wickham Series

The Wickham series consists of well-drained, gently sloping to strongly sloping soils on stream terraces. These soils formed in old alluvium derived mainly from material weathered from acidic rocks of the uplands.

In a representative profile the surface layer is dark-brown fine sandy loam about 7 inches thick. The subsoil is about 42 inches thick. The upper part of the subsoil is yellowish-red, firm sandy clay loam that has yellowish-brown mottles. The lower part is strong-brown or yellowish-brown, friable sandy clay loam that has yellowish-red, light yellowish-brown, and red mottles. Below these layers, and extending to a depth of about 64 inches, is mottled brownish-yellow and light-gray sandy clay loam.

Wickham soils are low in natural fertility and organic-matter content. Permeability is moderate, and the available water capacity is medium. The effective rooting zone is deep, and the shrink-swell potential is moderate. Unless limed, these soils are strongly acid to medium acid throughout. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage is cultivated or pastured, and the rest is mostly in forest or nonfarm uses. Slope, moderate permeability, and moderate shrink-swell potential are the most important limitations to the use of these soils.

Representative profile of Wickham fine sandy loam, 2 to 6 percent slopes, 0.5 mile southwest of Lewisville on State Road 1171, 3 miles southwest on State Road 1173, 0.2 mile south on farm road, and 60 feet east of farm road:

Ap—0 to 7 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; friable; many fine roots; few medium roots; few, medium, rounded pebbles; medium acid; abrupt, smooth boundary.

B21t—7 to 19 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, fine, subangular blocky structure; friable, sticky and slightly plastic; common fine roots; thin patchy clay films on faces of peds; medium acid; gradual, wavy boundary.

B22t—19 to 30 inches, yellowish-red (5YR 4/8) sandy clay loam; few, medium, faint, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm, sticky and plastic; thin continuous clay films on faces of peds; few fine roots; strongly acid; abrupt, smooth boundary.

B23t—30 to 39 inches, strong-brown (7.5YR 5/8) sandy clay loam; common, medium, distinct, yellowish-red (5YR 4/6) and few, medium, distinct, light yellowish-brown (2.5Y 6/4) mottles; weak, fine, subangular blocky structure; firm, sticky and slightly plastic; thin discontinuous clay films on faces of peds; strongly acid; gradual, wavy boundary.

B3—39 to 49 inches, yellowish-brown (10YR 5/8) sandy clay loam; common, medium, streaks and mottles of red (2.5YR 5/8); massive; friable, slightly sticky; common, medium, rounded pebbles; strongly acid; clear, wavy boundary.

C—49 to 64 inches, mottled brownish-yellow (10YR 6/8) and light-gray (2.5Y 7/2) sandy clay loam; massive; friable; few fine flakes of mica; strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to bedrock is more than 5 feet. The A horizon is 4 to 10 inches thick and is dark brown, brown, yellowish brown, or grayish brown. The B horizon ranges from 36 to 50 inches in thickness. The upper part of the B2t horizon is yellowish-red or red clay loam or sandy clay loam, and the lower part is strong-brown sandy clay loam or clay loam that is commonly mottled with red, yellow, or brown. The B3 horizon is yellowish-brown to yellowish-red sandy clay loam to sandy loam that has mottles of red, brown, and yellow. The C horizon is mottled brownish-yellow, yellowish-brown, or light-gray clay loam to sandy loam. In places, the C horizon is stratified layers of sandy loam and sandy clay loam. A stone line of rounded cobblestones and pebbles is above or within the C horizon in places.

Wickham fine sandy loam, 2 to 6 percent slopes (WkB).—This is a well-drained soil. It is in irregularly shaped areas on ridges or above the flood plain. The areas range from 2 to 40 acres in size. This soil has the profile described as representative of the series.

Included with this soil in mapping are areas of similar soils that have more clay in the upper part of the subsoil. Also included are a few areas of Vance and Hiwassee soils and a few small areas that have gray mottles within a depth of 30 inches.

Infiltration is moderate, and surface runoff is medium. Unless limed, this soil is strongly acid or medium acid throughout.

Most of the acreage is cultivated or pastured, and the rest is mostly in forest or other uses. This soil is well suited to all locally grown crops and pasture plants. Corn, soybeans, tobacco, and small grain are the main crops. Because of slope, the hazard of erosion is moderate if the soil is used for crops. Practices are needed that control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of moderate permeability and moderate shrink-swell potential. Capability unit IIe–1; woodland suitability group 3o7.

Wickham fine sandy loam, 6 to 10 percent slopes (WkC).—This is a well-drained soil on terraces. It is on smooth, fairly narrow upper side slopes or in sloping areas. Areas of this soil range from 2 to 30 acres in size.

The surface layer is yellowish-brown to grayish-brown fine sandy loam 4 to 8 inches thick. The subsoil

is red to yellowish-brown clay loam to sandy loam 40 to 50 inches thick. The lower part of the subsoil commonly has red, yellow, or brown mottles.

Included with this soil in mapping are a few areas that have a higher content of clay in the upper part of the subsoil, and a few small areas that have gray mottles within a depth of 30 inches. Also included are a few areas of Vance and Hiwassee soils.

Infiltration is moderate, and surface runoff is rapid. Unless limed, this soil is strongly acid or medium acid throughout.

Most of the acreage is in forest or other uses, and the rest is cultivated or pastured. This soil is well suited to most locally grown crops and pasture plants. Corn, soybeans, and small grain are the main crops. Because of slope, the hazard of erosion is severe if the soil is used for crops. Practices are needed that control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of slope, moderate permeability, and moderate shrink-swell potential. Capability unit IIIe–1; woodland suitability group 3o7.

Wickham fine sandy loam, 10 to 15 percent slopes (WkD).—This is a well-drained soil on terraces. It is on narrow side slopes adjacent to the flood plain or above a steep slope. Areas of this soil range from 2 to 20 acres in size.

The surface layer is yellowish-brown to dark grayish-brown fine sandy loam 4 to 8 inches thick. The subsoil is red to yellowish-brown clay loam to sandy loam 36 to 45 inches thick. Normally, the lower part of the subsoil has red, yellow, or brown mottles.

Included with this soil in mapping are a few areas of Wedowee, Wilkes, and Hiwassee soils.

Infiltration is moderately slow, and surface runoff is rapid. Unless limed, this soil is strongly acid or medium acid throughout.

Most of the acreage is in forest or other uses, and the rest is mostly cultivated or pastured. This soil is well suited to most locally grown crops and pasture plants. Corn, soybeans, and small grain are the main crops. Because of slope, the hazard of erosion is very severe if the soil is used for crops. Practices are needed that help control runoff and erosion. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Crops respond well to applications of fertilizer and lime. This soil has moderate limitations for most nonfarm uses because of moderate permeability, slope, and moderate shrink-swell potential. Capability unit IVe–1; woodland suitability group 3o7.

Wilkes Series

The Wilkes series consists of well-drained, sloping to steep soils of the uplands. These soils formed in residuum that weathered from mixed acidic and basic rocks.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 6 inches thick. The subsoil is yellowish-brown firm clay or clay loam about 10 inches thick. Below these layers, and extending to a depth of about 54 inches, is mottled yellowish-brown and olive-yellow, weathered rock that crushes to loam.

Wilkes soils are medium in natural fertility and low in organic-matter content. Permeability is moderately slow, and the available water capacity is low. The effective rooting zone is shallow, and the shrink-swell potential is moderate. Unless limed, these soils are medium acid to neutral throughout. Depth to the seasonal high water table is more than 5 feet.

Most of the acreage is in forest, and the rest is mostly cultivated or pastured. Slope, moderately slow permeability, and depth to bedrock are the most important limitations to the use of these soils.

Representative profile of Wilkes fine sandy loam in an area of Wilkes soils, 15 to 45 percent slopes, 6 miles north of Winston-Salem on State Highway 8, 0.9 mile east on State Highway 66, 0.4 mile north on State Road 1931, 0.4 mile northeast on private drive and farm road, 100 feet southeast of road, and 325 feet northeast of small stream in a field:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) fine sandy loam; moderate, fine, granular structure; friable; few fine roots; slightly acid; abrupt, smooth boundary.

B2t—6 to 11 inches, yellowish-brown (10YR 5/6) clay; weak, medium, subangular blocky structure; firm, very sticky and plastic; few fine roots; thin discontinuous clay films on faces of peds; common, fine, black specks of primary minerals; slightly acid; clear, wavy boundary.

B3—11 to 16 inches, yellowish-brown (10YR 5/4) clay loam; weak, fine, angular blocky structure; firm, slightly sticky and slightly plastic; common black and green specks and streaks of primary minerals; slightly acid; clear, wavy boundary.

C—16 to 54 inches, mottled yellowish-brown (10YR 5/6) and olive-yellow (2.5Y 6/6) weathered rock that crushes to loam; many fine green and black specks and streaks; few thin streaks of strong-brown clay loam in the upper 10 inches; slightly acid.

R—54 inches, bedrock.

The solum ranges from 6 to 20 inches in thickness. Depth to hard bedrock is 2 to 6 feet. The A horizon is dark grayish-brown to olive-brown loam, sandy loam, or fine sandy loam 3 to 9 inches thick. The B horizon is 3 to 11 inches thick. The B2t horizon is commonly yellowish-brown clay 2 to 8 inches thick, but it ranges from strong-brown to olive-brown clay to sandy clay loam. The B3 horizon is dark yellowish-brown to olive clay loam to sandy loam. It is mottled in places with brown and yellow. The C horizon is mottled brown, yellow, green, gray, and black weathered rock that crushes to clay loam to sandy loam.

Wilkes soils, 6 to 10 percent slopes (WlC).—These are well-drained soils on uplands. They are on narrow ridges and upper side slopes, in areas that range from 3 to 30 acres in size.

The surface layer is dark grayish-brown to olive-brown loam to fine sandy loam 4 to 9 inches thick. The subsoil is strong-brown to olive clay to sandy loam 4 to 11 inches thick. The lower part of the subsoil is mottled with brown and yellow in places.

Included with these soils in mapping are areas of Vance, Enon, Pacolet, and Wedowee soils.

Infiltration is moderate, and surface runoff is rapid. Unless they are limed, these soils are medium acid to neutral throughout.

Most of the acreage is in forest, and the rest mostly is cultivated, pastured, or in other uses. These soils are fairly well suited to most locally grown crops. Small

grain, tobacco, and pasture plants are the main crops. Because of slope, the hazard of erosion is severe if these soils are used for row crops. Practices are needed that control runoff and erosion. These soils are fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. These soils are severe limitations for most nonfarm uses because of slope, moderately slow permeability, and depth to bedrock. Capability unit IVe–3; woodland suitability group 4o1.

Wilkes soils, 10 to 15 percent slopes (WlD).—These are well-drained soils on uplands. They are on narrow side slopes that, in places, are adjacent to streams. Areas of these soils range from 3 to 20 acres in size.

The surface layer is dark grayish-brown to olive-brown loam to fine sandy loam 3 to 8 inches thick. The subsoil is strong-brown to olive clay to sandy loam 4 to 10 inches thick. The lower part of the subsoil has brown and yellow mottles in places.

Included with these soils in mapping are areas of Vance, Enon, Louisburg, and Wedowee soils.

Infiltration is moderately slow, and surface runoff is very rapid. Unless they are limed, these soils are medium acid to neutral throughout.

Most of the acreage is in forest or other uses, and the rest is mostly cultivated or pastured. These soils are fairly well suited to most locally grown crops. Small grain, tobacco, and pasture are the main crops. Because of slope, the hazard of erosion is very severe if these soils are used for row crops. Practices are needed that help control runoff and erosion. These soils are fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Crops respond fairly well to applications of fertilizer and lime. These soils have severe limitations for most nonfarm uses because of moderately slow permeability, slope, and depth to bedrock. Capability unit VIe–1; woodland suitability group 4o1.

Wilkes soils, 15 to 45 percent slopes (WlF).—These are well-drained soils on uplands. They are on the narrow lower side slopes or in steep, irregularly shaped areas. Areas of these soils range from 3 to 65 acres in size. The fine sandy loam in this unit has the profile described as representative of the series.

Included with these soils in mapping are areas of Louisburg, Tallapoosa, and Wedowee soils.

Infiltration is moderately slow, and surface runoff is very rapid.

Most of the acreage is in forest. These soils have severe limitations for most nonfarm uses because of moderately slow permeability, slope, and depth to bedrock. Capability unit VIIe–1; woodland suitability group 4r2.

Use and Management of the Soils

This section discusses use and management of the soils for crops and pasture, engineering purposes, woodland, and wildlife. It does not give detailed information about management of individual soils. For specific suggestions, consult a representative of the local office of the Soil Conservation Service, the Extension Service, or the Agricultural Experiment Station.

Use of Soils for Crops and Pasture[3]

This section has three main parts. The first part discusses the grouping of soils in the capability classification system. The second part discusses the capability units in Forsyth County and gives general management suggestions for each capability unit. The third part gives estimated yields for specific crops, based on a high level of management.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to horticultural crops or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees or engineering.

In the capability system, the kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use. (None in Forsyth County)

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat. (None in Forsyth County)

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, or water supply or to esthetic purposes. (None in Forsyth County)

CAPABILITY SUBCLASSES are soil groups within one

[3] J. E. POLLOCK, conservation agronomist, and A. J. ERNSTES, district conservationist, Soil Conservation Service, assisted in preparing this section.

class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, but not in Forsyth County, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w, s,* and *c,* because the soils in class V are subject to little or no erosion, although they have other limitations that restrict their use largely to pasture, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–1 or IIIe–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph, and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units

In the following pages the capability units in Forsyth County are described and suggestions for the use and management of the soils are given. To find the names of the soils in any given capability unit, refer to the "Guide to Mapping Units" at the back of this soil survey.

CAPABILITY UNIT IIe–1

This unit consists of well drained and moderately well drained, nearly level and gently sloping soils on uplands and stream terraces. The surface layer is fine sandy loam or sandy loam, and the subsoil is clay or sandy clay loam.

The soils in this unit are low in natural fertility and organic-matter content. They have a deep to moderately deep effective rooting zone. Available water capacity is medium, and permeability is moderate. Unless limed, these soils are very strongly acid to medium acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. These soils generally are well suited to all crops grown in the county. Small grain, corn, and tobacco are the main crops.

Erosion is a moderate hazard if these soils are cultivated. These soils are easy or fairly easy to keep in good tilth and can be worked throughout a wide range of moisture content. Runoff and erosion can be controlled by returning all crop residue to the soil, by practicing minimum tillage, by following a cropping system that includes close-growing crops 25 to 50 percent of the time, and by using contour tillage with diversions, terraces, or stripcropping. Natural draws, field borders, and other outlets needed for disposing of surface runoff should be vegetated with perennial grasses, preferably with a sod–forming grass. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IIe–2

Hiwassee loam, 2 to 6 percent slopes, is the only soil in this capability unit. It is a well-drained, gently sloping soil on uplands and stream terraces. It has a subsoil of firm clay or clay loam.

This soil is low in natural fertility and organic-matter content. It has a deep effective rooting zone. Available water capacity is medium, and permeability is moderate. The surface layer crusts and clods if worked when too wet. Unless it is limed, this soil is very strongly acid to slightly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. This soil is well suited to corn, small grain, pasture and hay plants, and most other locally grown crops. Corn and small grain are the main crops.

Erosion is a moderate hazard if this soil is cultivated. This soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content. Runoff and erosion can be controlled and soil tilth improved by returning all crop residue to the soil, practicing minimum tillage, using a cropping system that includes close-growing crops 25 to 50 percent of the time, and using contour tillage along with diversions, terracing, or stripcropping. Natural draws, field borders, and other outlets needed for disposing of surface runoff should be vegetated with perennial grass, preferably a sod-forming grass. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IIe–3

This unit consists of well drained and moderately well drained, gently sloping soils on uplands. The surface layer is loam or fine sandy loam, and the subsoil is firm or very firm clay to sandy clay or clay loam.

The soils in this unit are high to medium in natural fertility and low in organic-matter content. They have a moderately deep effective rooting zone. Available water capacity is high to medium, and permeability is slow. Unless limed, these soils are very strongly acid to neutral throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. These soils are well suited to fairly well suited to most locally grown crops. Small grain, corn, and soybeans are the main crops.

The hazard of erosion is moderate if these soils are cultivated. Generally these soils are easy or fairly easy to keep in good tilth and can be worked throughout a wide or fairly wide range of moisture content. Runoff and erosion can be controlled and soil tilth improved by returning all crop residues to the soil, practicing minimum tillage, protecting the soil surface with close-growing crops 30 to 50 percent of the time, and using contour tillage along with diversions, terracing, or stripcropping. Natural draws, field borders, and other outlets needed for disposing of surface water should be vegetated with perennial grass, preferably a sod-

forming grass. Crops respond fairly well or well to applications of fertilizer and lime.

CAPABILITY UNIT IIw–1

In this unit is the Congaree complex, which consists of well-drained, nearly level soils on stream flood plains. The surface layer ranges from loam to silt loam and fine sandy loam. The underlying layers are very fine sandy loam to loam.

The soils in this unit are low in natural fertility and organic-matter content. They have a deep effective rooting zone. Available water capacity is medium, and permeability is moderate. Unless limed, these soils are strongly acid to slightly acid throughout.

Most of the acreage is cultivated or pastured. These soils are well suited to all locally grown crops. Corn, small grain, and soybeans are the main crops.

These soils are easy to keep in good tilth and can be worked throughout a wide range of moisture content. The only serious hazard to intensive use of the soils is flooding. These soils are flooded frequently for very brief periods of time, and only occasional damage to crops takes place. In some areas simple drainage may be needed to drain small wet spots. These soils can be used for row crops each year if all crop residue is returned to the soil. Organic-matter content and soil tilth can be maintained at a high level if soil-conserving crops, preferably perennial grasses, are included in the cropping system every other year or one year out of three. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IIIe–1

This unit consists of well-drained and excessively drained, gently sloping to sloping soils on uplands and stream terraces. The surface layer is sandy loam, fine sandy loam, or loamy sand. The subsoil is clay, clay loam, sandy clay loam, sandy clay, or sandy loam.

The soils in this unit are low in natural fertility and organic-matter content. Available water capacity is medium, and permeability is moderate. The effective rooting zone is deep or moderately deep. Unless limed, these soils are very strongly acid to medium acid.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses.

The hazard of erosion is severe if these soils are cultivated. These soils are easy or fairly easy to keep in good tilth and can be worked throughout a wide or fairly wide range of moisture content. Soil and water losses can be reduced by practicing minimum tillage, returning crop residue to the soil, protecting the soil surface with close-growing crops 50 to 75 percent of the time, and using contour tillage along with stripcropping (fig. 6), terracing, or diversions. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IIIe–2

This unit consists of well-drained, gently sloping to sloping soils on uplands and stream terraces. The surface layer is loam or clay loam, and the subsoil is clay, clay loam, or sandy clay loam.

The soils in this unit are low in natural fertility and organic-matter content. They have a deep to moderately deep effective rooting zone. Available water capacity is medium, and permeability is moderate. The

Figure 6.—Red clover and fescue growing in strips. The soil is Cecil sandy loam, 6 to 10 percent slopes, which is in capability unit IIIe–1.

surface layer crusts and clods if worked when too wet. Unless the soils are limed, they are very strongly acid to slightly acid throughout.

Most of the acreage is cultivated or pastured, and the rest is in forest or nonfarm uses. These soils generally are well suited or fairly well suited to corn, small grain, pasture and hay plants, and most other locally grown crops.

The hazard of erosion is severe if these soils are cultivated. Most of these soils are difficult to keep in good tilth, and they can be worked within only a narrow range of moisture content. Soil and water losses can be reduced, soil tilth improved, and the organic-matter content increased by returning all crop residue to the soil, practicing minimum tillage, protecting the soil with close-growing crops 50 to 75 percent of the time, and using contour tillage along with stripcropping, terracing, or diversions. Natural draws, field borders, and other outlets needed for disposing of surface water should be vegetated with perennial grass, preferably fescue or a similar sod-forming grass. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IIIe–3

This unit consists of well-drained, sloping soils on uplands. The surface layer is loam or fine sandy loam. The subsoil is clay, clay loam, or sandy clay loam.

The soils in this unit are high to medium in natural fertility and low in organic-matter content. They have a moderately deep effective rooting zone. Available water capacity is medium, and permeability is slow. Unless limed, these soils are very strongly acid to neutral throughout.

Most of the acreage is in forest, and the rest is mostly cultivated or pastured. These soils are well suited or fairly well suited to most locally grown crops. Small grain, corn, and soybeans are the main crops.

The hazard of erosion is severe if these soils are cultivated. These soils are generally easy or fairly easy to keep in good tilth and can be worked throughout a wide or fairly wide range of moisture content. Soil and

water losses can be reduced, soil tilth improved, and organic-matter content increased by returning all crop residue to the soil, practicing minimum tillage, protecting the soil with close-growing crops 50 to 75 percent of the time, and using contour tillage along with stripcropping, terracing, or diversions. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IIIw–1

Chewacla loam is the only soil in this unit. It is a somewhat poorly drained, nearly level soil on stream flood plains. The surface layer is loam, and the subsoil is loam, clay loam, or silty clay loam.

This soil is low in natural fertility and organic-matter content. Available water capacity is medium, and permeability is moderate. Unless limed, this soil is very strongly acid to medium acid throughout.

Most of the acreage is pastured or cultivated, and the rest is in forest. This soil is fairly well suited to corn, oats, fescue, and a few other locally grown crops that are fairly tolerant to water. It is well suited to pasture.

This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Wetness and flooding are the important limitations to use and management. Some artificial drainage is needed for most crops. Organic-matter content can be maintained by returning large quantities of crop residue to the soil. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IVe–1

This unit consists of well-drained to excessively drained, sloping to strongly sloping soils on uplands and stream terraces. The surface layer is sandy loam, fine sandy loam, or loamy sand. The subsoil is clay, clay loam, sandy clay loam, or sandy loam.

The soils in this unit are low in natural fertility and organic-matter content. They have a deep to moderately deep effective rooting zone. Available water capacity is medium and permeability is moderate to rapid. Unless limed, these soils are very strongly acid to medium acid throughout.

Most of the acreage is in forest, and the rest mostly is cultivated or pastured. These soils are generally well suited or fairly well suited to most crops grown in the county. Small grain, corn, and tobacco are the main crops.

The hazard of erosion is very severe if these soils are tilled. These soils are easy or fairly easy to keep in good tilth and can be worked throughout a wide or fairly wide range of moisture content. Slope and leaching are limitations to consider in use and management. Soil and water losses can be reduced, soil tilth improved, and organic-matter content increased by returning crop residue to the surface of the soil, practicing minimum tillage, protecting the soil with close-growing crops, preferably perennials, 75 percent or more of the time, and using contour cultivation along with field borders, stripcropping, and diversions on long slopes. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IVe–2

This unit consists of well-drained, sloping to strongly sloping soils on uplands. The surface layer is clay loam to loam, and the subsoil is clay, clay loam, or sandy clay loam.

The soils in this unit are low in natural fertility and organic-matter content. They have a deep to moderately deep effective rooting zone. Available water capacity is medium, and permeability is moderate. Unless limed, these soils are very strongly acid to slightly acid throughout.

Most of the acreage is forested, and the rest mainly is cultivated or pastured. These soils are fairly well suited to most locally grown crops. They are well suited to grass. The main crops are hay, pasture, corn, and small grain.

Erosion is a very severe hazard if these soils are tilled. Slope and erosion are the main limitations to use and management. These soils are difficult to keep in good tilth and can be worked within only a narrow range of moisture content. Soil and water losses can be reduced, soil tilth improved, and the organic-matter content increased if crop residue is returned to the soil, if the soil surface is protected with close-growing crops, preferably perennials, 75 percent or more of the time, if minimum tillage and contour cultivation are practiced, if the conservation cropping system is arranged in strips, and if diversions are used on long slopes. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT IVe–3

This unit consists of well-drained, sloping to strongly sloping soils on uplands. The surface layer is loam to fine sandy loam. The subsoil is clay, clay loam, sandy clay loam, or sandy loam.

The soils in this unit are high to medium in natural fertility and low in organic-matter content. They have a moderately deep to shallow effective rooting zone. Available water capacity is medium to low, and permeability is slow to moderately slow. Unless limed, these soils are very strongly acid to neutral throughout.

Most of the acreage is in forest, and the rest mostly is cultivated or pastured. These soils are fairly well suited to most locally grown crops. Small grain, corn, and soybeans are the main crops. Some tobacco is grown on soils that have a sandy surface layer.

The hazard of erosion is very severe if the soils are cultivated. Generally these soils are easy or fairly easy to keep in good tilth and can be worked throughout a wide range of moisture content. Soil and water losses can be reduced, soil tilth improved, and organic-matter content increased by returning crop residue to the soil, practicing minimum tillage, protecting the soil with close-growing crops, preferably perennials, 75 percent or more of the time, and using contour tillage along with stripcropping and diversions. Crops respond well or fairly well to applications of fertilizer and lime.

CAPABILITY UNIT IVw–1

This unit consists only of Wehadkee soils. These soils are poorly drained and nearly level and are on stream flood plains. The surface layer is dominantly loam. The subsoil is sandy clay loam to sandy loam.

The soils in this unit are low in natural fertility and low to medium in organic-matter content. Available water capacity is medium, and permeability is mod-

erate. Unless limed, these soils are medium acid to slightly acid throughout.

Most of the acreage is in forest or native grasses. These soils are well suited to pasture and water-tolerant trees. If adequately drained, they are fairly well suited to white clover, annual lespedeza, and fescue.

A seasonal high water table, flooding, or seepage from the adjoining uplands is the major limitation to the use and management of these soils. A complete drainage system is needed for growing all crops and most pasture plants. Crops respond fairly well to applications of fertilizer and lime.

CAPABILITY UNIT VIe–1

This unit consists of well-drained to excessively drained, sloping to steep soils on uplands and stream terraces. The surface layer is loam, fine sandy loam, sandy loam, or loamy sand. The subsoil is clay, clay loam, sandy clay loam, or sandy loam.

The soils in this unit are medium to low in natural fertility and low in organic-matter content. Available water capacity is medium to low, and permeability is moderately slow to rapid. Unless limed, these soils range from very strongly acid to neutral throughout.

Most of the acreage is in forest, and the rest is mainly used for pasture or nonfarm purposes. Because of slope, these soils generally are poorly suited to cultivated crops. They are better suited to trees and wildlife habitat than to most other uses. They are fairly well suited to the grasses and legumes commonly grown in the county.

Pasture seeding or renovation should be done in alternate strips to control erosion. Top growth of pasture plants should be maintained at 3 inches or more. This is better accomplished by rotational grazing than by other means. Using this method, animals are allowed to graze one pasture until the plants are 3 inches high, and then they graze another pasture. Crops respond well or fairly well to applications of fertilizer and lime.

CAPABILITY UNIT VIe–2

This unit consists of well-drained, sloping to strongly sloping soils on uplands. These soils are eroded or severely eroded, and there are shallow to deep gullies in places. The surface layer is clay loam. The subsoil is clay to sandy clay loam.

The soils in this unit are low in natural fertility and organic-matter content. Available water capacity is medium, and permeability is moderate. Unless limed, these soils are very strongly acid to medium acid throughout.

Most of the acreage is in forest, and the rest mostly is in pasture and other uses. Because of slope and the hazard of severe erosion, these soils are dominantly poorly suited to cultivated crops. They are fairly well suited to pasture and trees. If the soils are used for pasture, seeding or renovation should be done in alternate strips to control erosion. The more severely eroded and gullied areas require more intensive management to establish any kind of vegetation. Kudzu and sericea lespedeza are suitable crops to grow in these soils. Crops respond well to applications of fertilizer and lime.

CAPABILITY UNIT VIIe–1

This unit consists of well-drained to excessively drained, moderately steep or steep soils on uplands. The surface layer is clay loam, sandy loam, fine sandy loam, or loamy sand. The subsoil is clay, clay loam, sandy clay loam, fine sandy clay loam, or sandy loam.

The soils in this unit are medium to low in natural fertility and low in organic-matter content. Available water capacity is medium to low, and permeability is moderately slow to rapid. Unless limed, these soils are very strongly acid to neutral throughout.

Most of the acreage is in forest, and the rest mostly is pastured. Because of slope and the hazard of erosion, these soils are unsuited to cultivated crops. They are better suited to forest, wildlife habitat, and recreation than to most other uses.

CAPABILITY UNIT VIIe–2

This unit consists mainly of steeper soils that have been cut by numerous deep and shallow gullies. The surface layer, if present, is mainly clay loam. Erosion has removed nearly all the original surface layer and, in many places, has cut through the subsoil until only remnants of the original soil profile remain. The remaining undisturbed subsoil is clay or clay loam.

The soils in this unit generally are very low in natural fertility and organic–matter content. Generally, available water capacity is medium and permeability is slow to moderate.

All of the acreage is in forest or is idle. Because of erosion, gullying, and slope, these soils are not suited to cultivation. These soils are better suited to trees, wildlife habitat, and recreation than to most other uses.

These soils should be used for trees, kudzu, or other close-growing plants to prevent further damage to the surrounding areas and to reduce silting of streams below. These soils are the most difficult in the county on which to establish and maintain any kind of vegetation.

Estimated yields

Table 2 gives estimates of yield of the principal crops grown in Forsyth County. Yield of any crop depends upon a combination of soil, climate, and the level of management. The estimates in table 2 are based on a high level of management or intensive management.

The following intensive management practices are considered necessary if the yields given in table 2 are to be obtained.

1. Fertilizer and lime are added according to the needs indicated by soil tests.
2. Weeds, insects, and plant diseases are controlled.
3. High-yielding varieties of crops are grown.
4. Legumes are inoculated.
5. The soils are properly tilled, and the crops are properly cultivated.
6. Crops are grown in rotations that conserve water and protect the soil.
7. Runoff is controlled.
8. Pasture grazing is rotated and controlled.

The estimates given in the table are based on considerable experience with the crops and the soils of the county, and all data available have been used. All estimates were made on the assumptions that the average amount of rainfall will be received, that no supple-

TABLE 2.—*Estimated average acre yields of crops under a high level of management*

[Dashes indicate that the crop is not commonly grown on the soil or that there is no data on which to base an estimate]

Soil	Corn	Soybeans	Oats	Wheat	Barley	Tobacco	Corn for silage	Hay		Pasture
								Soybeans	Fescue	Fescue
	Bu	*Bu*	*Bu*	*Bu*	*Bu*	*Lb*	*Tons*	*Tons*	*Tons*	*Animal-unit-days* [1]
Altavista fine sandy loam, 1 to 6 percent slopes.	85	45	80	60	60	2,100	19	4.3	2.4	260
Appling sandy loam, 2 to 6 percent slopes.	90	40	85	65	60	2,100	18	4.1	2.1	240
Appling sandy loam, 6 to 10 percent slopes.	80	35	80	60	55	2,000	16	3.4	1.8	210
Cecil sandy loam, 2 to 6 percent slopes	95	40	90	65	60	2,100	18	4.1	2.1	240
Cecil sandy loam, 6 to 10 percent slopes	90	35	85	60	55	2,000	16	3.4	1.8	210
Cecil sandy loam, 10 to 15 percent slopes	80	25	75	55	50	1,900	14	2.5	1.4	170
Cecil clay loam, 2 to 6 percent slopes, eroded.	70	30	70	50	45	1,300	14	3.1	1.7	190
Cecil clay loam, 6 to 10 percent slopes, eroded.	60	25	60	40	35	1,250	12	2.4	1.3	160
Chewacla loam	90	30	75	----	----	----	18	3.0	2.4	260
Congaree complex	100	45	80	70	65	2,400	21	4.4	2.5	265
Cut and fill land	----	----	----	----	----	----	----	----	----	----
Enon fine sandy loam, 2 to 6 percent slopes.	75	35	70	50	45	1,800	15	3.3	1.8	210
Enon fine sandy loam, 6 to 10 percent slopes.	65	30	65	45	40	1,600	13	2.8	1.6	190
Enon fine sandy loam, 10 to 15 percent slopes.	55	20	60	35	30	1,600	10	2.0	1.3	150
Gullied land	----	----	----	----	----	----	----	----	----	----
Hiwassee loam, 2 to 6 percent slopes	95	45	90	70	65	1,800	19	4.3	2.3	255
Hiwassee loam, 6 to 10 percent slopes	85	40	80	65	60	1,700	17	3.7	2.1	240
Hiwassee loam, 10 to 15 percent slopes	75	30	70	60	55	1,600	15	3.0	1.9	220
Hiwassee loam, 15 to 25 percent slopes	----	----	----	----	----	----	----	2.1	1.5	180
Hiwassee clay loam, 2 to 6 percent slopes, eroded.	75	35	70	55	50	----	15	3.4	1.8	210
Hiwassee clay loam, 6 to 10 percent slopes, eroded.	70	30	65	50	45	----	13	2.8	1.6	190
Hiwassee clay loam, 10 to 15 percent slopes, eroded.	55	20	50	40	35	----	11	2.0	1.3	150
Iredell fine sandy loam, 2 to 6 percent slopes.	50	20	60	40	35	1,500	11	2.2	1.6	190
Louisburg loamy sand, 6 to 15 percent slopes.	----	----	----	----	----	----	----	2.0	1.0	120
Louisburg loamy sand, 15 to 45 percent slopes.	----	----	----	----	----	----	----	.8	.7	80
Louisburg-Wedowee complex, 15 to 25 percent slopes.	----	----	----	----	----	----	----	2.0	.8	110
Madison fine sandy loam, 2 to 6 percent slopes.	90	40	85	65	60	2,000	18	4.0	2.0	235
Madison fine sandy loam, 6 to 10 percent slopes.	80	30	75	60	55	1,900	16	3.2	1.8	210
Madison fine sandy loam, 10 to 15 percent slopes.	70	20	60	50	45	1,800	13	2.2	1.3	160
Madison fine sandy loam, 15 to 45 percent slopes.	----	----	----	----	----	----	----	1.1	.7	100
Madison clay loam, 2 to 6 percent slopes, eroded.	70	30	70	50	45	1,300	14	3.0	1.7	190
Madison clay loam, 6 to 10 percent slopes, eroded.	60	20	60	40	35	1,200	11	2.2	1.3	155
Madison clay loam, 10 to 15 percent slopes, eroded.	40	15	35	30	30	1,150	8	1.4	.7	90
Mecklenburg loam, dark surface variant, 2 to 6 percent slopes.	80	35	70	55	50	----	16	3.5	1.9	215
Mecklenburg loam, dark surface variant, 6 to 10 percent slopes.	75	30	65	50	45	----	14	3.0	1.7	190
Mecklenburg loam, dark surface variant, 10 to 15 percent slopes.	65	20	60	35	30	----	11	2.2	1.3	150
Pacolet fine sandy loam, 2 to 6 percent slopes.	75	40	85	65	60	2,100	18	3.9	2.0	235
Pacolet fine sandy loam, 6 to 10 percent slopes.	65	30	75	60	55	1,900	16	3.2	1.8	210
Pacolet fine sandy loam, 10 to 15 percent slopes.	55	20	60	50	45	1,750	13	2.2	1.3	160

TABLE 2.—*Estimated average acre yields of crops under a high level of management*—Continued

Soil	Corn	Soybeans	Oats	Wheat	Barley	Tobacco	Corn for silage	Hay		Pasture
								Soybeans	Fescue	Fescue
	Bu	*Bu*	*Bu*	*Bu*	*Bu*	*Lb*	*Tons*	*Tons*	*Tons*	*Animal-unit-days*[1]
Pacolet fine sandy loam, 15 to 45 percent slopes.								1.1	.7	100
Pacolet clay loam, 2 to 6 percent slopes, eroded.	70	30	60	50	45	1,350	14	3.0	1.7	190
Pacolet clay loam, 6 to 10 percent slopes, eroded.	55	20	50	40	35	1,200	11	2.2	1.3	155
Pacolet clay loam, 6 to 10 percent slopes, severely eroded.								1.8	1.1	130
Pacolet clay loam, 10 to 15 percent slopes, eroded.							8	1.4	.9	120
Pacolet clay loam, 15 to 45 percent slopes, eroded.										60
Pacolet complex, 10 to 25 percent slopes, severely eroded.										
Pacolet-Urban land complex, 2 to 10 percent slopes.										
Pacolet-Urban land complex, 10 to 25 percent slopes.										
Tallapoosa fine sandy loam, 6 to 15 percent slopes.								2.1	1.2	140
Tallapoosa fine sandy loam, 15 to 45 percent slopes.										60
Vance sandy loam, 2 to 6 percent slopes	75	35	70	55	50	2,100	15	3.3	1.8	210
Vance sandy loam, 6 to 10 percent slopes.	65	30	60	50	45	1,800	13	2.8	1.6	190
Vance sandy loam, 10 to 15 percent slopes.	55	20	50	30	30	1,400	11	2.0	1.3	150
Wedowee sandy loam, 2 to 6 percent slopes.	90	40	85	65	60	2,100	18	3.9	2.0	235
Wedowee sandy loam, 6 to 10 percent slopes.	80	30	75	60	55	2,000	16	3.2	1.7	200
Wedowee sandy loam, 10 to 15 percent slopes.	60	20	60	50	45	1,900	13	2.2	1.3	160
Wedowee-Louisburg complex, 2 to 6 percent slopes.	80	30	75	55	50	1,950	16	3.0	1.7	190
Wedowee-Louisburg complex, 6 to 10 percent slopes.	65	25	60	50	45	1,850	13	2.5	1.4	165
Wedowee-Louisburg complex, 10 to 15 percent slopes.								2.0	.9	120
Wehadkee soils	60	25	30				11		1.8	210
Wickham fine sandy loam, 2 to 6 percent slopes.	90	40	85	65	60	2,000	18	4.1	2.1	240
Wickham fine sandy loam, 6 to 10 percent slopes.	80	35	75	60	55	1,900	16	3.4	1.8	210
Wickham fine sandy loam, 10 to 15 percent slopes.	70	25	60	55	50	1,800	14	2.5	1.4	170
Wilkes soils, 6 to 10 percent slopes	50		55	50	45	1,600	12	2.4	1.3	160
Wilkes soils, 10 to 15 percent slopes								1.8	.9	120
Wilkes soils, 15 to 45 percent slopes										

[1] Animal-unit-days is a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multiplied by the number of days the pasture is grazed during a single grazing season without injury to the sod. An acre of pasture that provides 30 days of grazing for 2 cows has a carrying capacity of 60 cow-acre-days. An animal unit is 1 cow, 1 steer, or 1 horse, 5 hogs, or 7 sheep or goats.

mental irrigation will be used, that adequate drainage will be established, and that no damaging flood will take place.

Engineering Uses of the Soils[4]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various de-

[4] A. J. MCCRACKEN, civil engineer, Soil Conservation Service, assisted in writing this section.

TABLE 3.—*Engineering*

[Tests performed by the North Carolina State Highway Commission according to

Soil name and location	Parent material	Report No.	Depth from surface	Moisture density [1]		
				Maximum dry density	Optimum moisture	No. 4 (4.7 mm)
		S65NC–34	*In*	*Lb per cu ft*	*Pct*	
Appling sandy loam:						
2 miles west of Kernersville on State Highway 66 and old U.S. Highway 421, 400 feet north of State Highway 66, and 350 feet west of farm road. (Modal)	Granite.	6–1	0–7	123	10	100
		6–4	15–34	94	27	100
		6–6	48–78	100	22	100
Cecil sandy loam:						
1 mile north of Union Cross on Union Cross Road, 150 feet east of Union Cross Road, directly in front of Robert B. Glenn School. (Modal)	Gneiss.	1–1	0–8	118	13	----------
		1–3	20–45	93	26	----------
		1–5	52–83	100	20	----------
Pacolet fine sandy loam:						
2 miles south of Winston-Salem, west of State Highway 150 and south of Clemmonsville Road at the end of farm road. (Modal)	Gneiss.	7–1	0–6	114	14	100
		7–3	9–25	93	27	100
		7–5	32–76	101	21	----------
Iredell fine sandy loam:						
1½ miles west of Lewisville; 0.2 miles north of Shallowford Road on Conrad Road; 150 feet east of road. (Modal)	Diorite and gabbro.	2–1	0–8	120	12	[5] 95
		2–2	8–20	----------	----------	----------
		2–5	29–54	107	20	100
Madison fine sandy loam:						
12 miles northeast of Winston-Salem, 1 mile northeast of U.S. Highway 158 on county road, 150 feet east of county road. (Modal)	Quartz mica schist or gneiss.	8–1	0–6	115	14	100
		8–2	6–23	97	24	----------
		8–4	29–46	102	21	----------

[1] Based on AASHO Designation: T 99–70, Methods A and C (*1*).

[2] Mechanical analyses according to AASHO Designation: T 88–70 (*1*). Results by this procedure may differ somewhat from results by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material

grees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables. Table 3 shows results of engineering laboratory tests on soil samples; table 4 gives several estimated soil properties significant to engineering; and table 5 gives interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in table 5, and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engi-

test data

standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis[2]							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—							
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	(0.05 mm)	(0.02 mm)	(0.005 mm)	(0.002 mm)			AASHO[3]	Unified[4]
97	71	32	29	24	15	10	17	1	A–2–4(0)	SM
99	84	68	68	67	64	60	62	26	A–7–5(17)	MH
98	73	46	44	39	34	32	54	14	A–7–5(4)	SM
100	78	40	37	34	23	17	24	6	A–4(1)	SM–SC
100	88	64	63	60	50	46	68	26	A–7–5(15)	MH
100	84	44	39	30	20	17	51	5	A–5(2)	SM
97	78	47	44	39	25	17	25	6	A–4(2)	SM–SC
98	88	74	72	67	56	50	71	37	A–7–5(20)	MH
100	79	56	51	39	26	23	51	13	A–7–5(7)	MH
92	78	46	37	25	15	11	21	2	A–4(3)	SM
----------	100	93	92	92	86	83	114	82	A–7(20)	CH
100	91	46	38	26	15	12	38	10	A–4(2)	SM
97	77	38	36	32	20	16	25	4	A–4(0)	SM
100	90	67	65	62	53	48	57	27	A–7–5(16)	MH or CH
100	80	42	39	36	30	29	45	15	A–7–5(2)	SM

coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soil.

[3] Based on AASHO Designation: M 145–66 (*1*).

[4] SCS and BPR have agreed to consider that all soils having plasticity indexes within 2 points of A-line are to be given a borderline classification. Examples of borderline classification obtained by this use are SM–SC and MH–CH.

[5] 100 percent passed ¾–inch sieve; 99 percent passed ⅜–inch sieve.

neering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists. The Glossary defines many of the terms commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*10*) used by the SCS engineers, Department of Defense, and others and the AASHO system (*1*) adopted by the American Association of State Highway Officials.

In the Unified system, soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. They are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML–CL.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribu-

tion, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refiinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, with group index numbers in parentheses, is shown in table 3; the estimated classification, without group index numbers, is given in table 4 for all soils mapped in the survey area.

Soil test data

Table 3 contains engineering test data for some of the major soil series in Forsyth County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine the liquid limit and the plastic limit. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density or compaction data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density*. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic. If the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic; and the liquid limit, from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Liquid limit and plasticity index are based on tests of soil samples in table 3.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 4. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 4.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 4 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

The estimates of permeability are for soil material in its natural state. They are based on field observations and limited laboratory data.

Available water capacity refers to the water in the soil that is available to plants. It is the amount of water held in the soil between field capacity and the permanent wilting point, that is, between one-third atmosphere and 15 atmospheres of tension. The amounts are based on laboratory tests of a limited number of soils; for soils not tested, estimates are based on similar soils.

Reaction, or the degree of acidity or alkalinity, is given in terms of pH values.

Shrink-swell potential indicates the expected change in volume when the moisture content changes. It is estimated mainly on the basis of the amount and type of clay in a soil. The soils classified as CH and A–7, in general, have a high shrink-swell potential. Sandy soils have a low shrink-swell potential.

Engineering interpretations of the soils

The demand for housing, shopping centers, schools, parks, golf courses, and other developments is increasing in Forsyth County. In selecting a site for a home, an industry, recreational use, or other related farm and urban purposes, the suitability of the soils in each site for such use must be determined. The information in table 5 was prepared chiefly for local officials, planners, developers, architects (building and landscape), realtors, private landowners, farmers, and others interested in the use of the soils in the county as structural material or as foundation upon which structures are built (fig. 7).

The estimated interpretations in table 5 are based on the engineering properties of soils shown in table 4, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Forsyth County. In table 5, ratings are used to summarize limitation or suitability of the soils for all listed purposes other than for ponds and reservoirs, embankments, and drainage for crops and pasture. For these particular uses, table 5 lists those soil features not to be overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* means soil properties generally favorable for the rated use, or in other words, limitations that are minor and easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning

Figure 7.—Roads under construction for a housing development on Pacolet fine sandy loam, 10 to 15 percent slopes.

and design. *Severe* means soil properties so unfavorable and so difficult to correct or overcome as to require major soil reclamation and special designs.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have meanings approximately parallel to the terms slight, moderate, and severe, respectively.

Where a hazard of flooding affects the intended use, it is rated according to the frequency of flooding and the length of time that water remains on the surface. The ratings take into account water from stream overflow, runoff, or seepage standing or flowing on the soil surface. *Very frequent* means that flooding occurs more than once each year; *frequent,* once in 1 to 5 years; and *infrequent,* once in 5 to 10 years. *Extremely brief* floods last less than 2 days; *very brief* floods, 2 to 7 days; *brief* floods, 7 days to 1 month; and *long* floods, 1 to 6 months.

Following are explanations of some of the columns in table 5.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage, within a depth of 2 to 5 feet, long enough for bacteria to decompose the solids. A lagoon has a nearly level floor and sides or embankments of compacted soil material. The assumptions are made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic-matter content, and slope, and if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amount of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Ratings for light industries are for the undisturbed soils that are used to support building foundations. Emphasis is on foundations, ease of excavation for underground utilities, and corrosion potential to uncoated steel pipe. The undisturbed soil is rated for spread footing foundations for buildings less than three stories high or foundation loads not in excess of that weight. Properties affecting load-supporting capacity and settlement under load are wetness, flooding, texture, plasticity, density, and shrink-swell behavior. Properties affecting excavation are wetness, flooding, slope, and depth to bedrock. Properties affecting corrosion of buried uncoated steel pipe are wetness, texture, total acidity, and electrical resistivity.

Dwellings, as rated in table 5, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 5 apply only to a depth of about 6 feet, and therefore limitation ratings of slight or moderate may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet, but regardless of that, every site should be investigated before it is selected.

Local roads and streets, as rated in table 5, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade, and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material, and also the shrink-swell potential, indicate load-supporting

TABLE 4.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. fully the instructions for referring to other series that appear in the first column

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	Classification	
	Bedrock	Seasonal high water table		USDA texture	Unified
	Ft	*Ft*	*In*		
Altavista: AlB Subject to flooding.	>5	2.5	0–11 11–49 49–70	Fine sandy loam Sandy clay loam Loamy sand	SM SC, CL SM
Appling: ApB, ApC	>5	>5	0–7 7–48 48–78	Sandy loam Clay, sandy clay loam Sandy loam	SM MH, SC SM
Cecil: CcB, CcC, CcD, CeB2, CeC2	>5	>5	0–8 8–45 45–83	Sandy loam Clay loam, silty clay loam Clay loam	SM, SM–SC MH MH, SM
Chewacla: Ch Subject to flooding.	>5	1.5	0–15 15–38 38–60	Loam Clay, loam, silty clay loam Loamy sand	ML ML, CL SM
Congaree: Co Subject to flooding.	>5	6	0–9 9–61 61–74	Loam Loam, very fine sandy loam. Loamy sand, sandy loam	ML ML, CL SM
Cut and fill land: Cu. Estimates were not made because soil material is too variable.					
Enon: EnB, EnC, EnD	>4	>5	0–7 7–37 37–60	Fine sandy loam Clay Fine sandy loam	SM CH, MH SM
Gullied land: Gu. Estimates were not made because soil material is too variable.					
Hiwassee: HlB, HlC, HlD, HlE, HmB2, HmC2, HmD2.	>5	>5	0–7 7–57 57–84	Loam Clay, clay loam Sandy clay, loam	SM, ML MH, CH ML, SM
Iredell: IrB	3–6	[1] 1–2	0–8 8–27 27–57	Fine sandy loam Clay Loam	ML, SM CH SM, ML
*Louisburg: LoD, LoF, LwE For the Wedowee part of LwE, see the Wedowee series.	2–6+	>5	0–8 8–20 20–50	Loamy sand Sandy loam Coarse loamy sand	SM SM SP, SM
Madison: MaB, MaC, MaD, MaF, McB2, McC2, McD2.	3–5+	>5	0–6 6–34 34–58	Fine sandy loam Clay, clay loam Sandy clay loam	SM, ML MH, CH, CL CL, SM
Mecklenburg: MeB, MeC, MeD	>4	>5	0–7 7–30 30–62	Loam Clay Clay loam	ML MH CH, CL
Pacolet: PaB, PaC, PaD, PaF, PcB2, PcC2, PcC3, PcD2, PcF2, PcE3, PuC, PuE. Estimates were not made for Urban land part of PuC and PuE, because soil material is too variable to be estimated.	>4	>4	0–6 6–32 32–76	Fine sandy loam Clay, clay loam Sandy clay loam	SM, ML, SM–SC MH, CH MH, SM

See footnotes at end of table.

significant to engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow care-of this table. The symbol > means greater than; the symbol < means less than]

Class.—Con.	Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
AASHO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
					In per hr	*In per in of soil*	*pH*	
A–4	100	100	75–85	40–50	2.0–6.0	0.11–0.15	5.1–6.5	Low.
A–6	100	100	80–90	36–55	0.6–2.0	0.12–0.17	5.1–6.0	Low.
A–2	100	100	50–75	15–30	2.0–6.0	0.06–0.10	5.1–6.0	Low.
A–2, A–4	100	95–100	60–75	30–40	2.0–6.0	0.10–0.14	4.5–5.5	Low.
A–7, A–6	100	95–100	80–95	36–95	0.6–2.0	0.12–0.15	4.5–5.5	Low.
A–6, A–7, A–2	100	95–100	60–75	30–50	0.6–2.0	0.10–0.14	4.5–5.5	Low.
A–2, A–4	100	100	60–80	30–45	2.0–6.0	0.10–0.14	4.5–6.0	Low.
A–7	100	100	85–95	60–90	0.6–2.0	0.12–0.18	4.5–6.0	Low.
A–7, A–5	100	100	80–95	40–80	0.6–2.0	0.15–0.20	4.5–6.0	Low.
A–4	100	100	85–95	60–75	0.6–2.0	0.15–0.20	5.1–6.5	Low.
A–4, A–6	100	100	90–100	70–95	0.6–2.0	0.15–0.22	5.1–6.0	Low.
A–2	100	100	50–75	15–30	>6.0	0.06–0.10	5.1–6.0	Low.
A–4	100	100	85–95	60–75	0.6–6.0	0.15–0.20	5.1–6.5	Low.
A–4	100	100	85–95	50–75	0.6–2.0	0.13–0.20	5.1–6.5	Low.
A–2, A–4	100	100	50–75	15–40	0.6–6.0	0.06–0.14	5.1–6.5	Low.
A–4	100	100	70–85	40–50	2.0–6.0	0.11–0.15	5.6–7.3	Low.
A–7	100	100	90–100	75–95	0.06–0.2	0.12–0.18	5.6–7.3	High.
A–4	100	100	70–85	40–50	0.06–0.2	0.11–0.15	5.6–7.3	Moderate.
A–4	100	90–100	80–95	45–75	2.0–6.0	0.15–0.20	5.1–6.5	Low.
A–6, A–7	100	95–100	90–100	70–95	0.6–2.0	0.12–0.20	5.1–6.5	Low.
A–5, A–6	100	95–100	80–100	36–80	0.6–2.0	0.18–0.22	5.1–6.5	Low.
A–4	90–100	90–100	70–85	40–55	2.0–6.0	0.11–0.15	5.6–7.3	Low.
A–7	100	100	90–100	75–95	0.06–0.2	0.12–0.18	5.6–7.3	High.
A–4	100	100	85–95	40–75	0.06–0.6	0.15–0.20	5.6–7.3	Moderate.
A–2	100	100	50–75	15–30	>6.0	0.06–0.10	4.5–5.5	Low.
A–2, A–4	100	100	60–70	30–40	6.0–20	0.10–0.14	4.5–5.5	Low.
A–2	100	95–100	45–75	10–30	>6.0	0.04–0.07	4.5–5.5	Low.
A–4	100	95–100	70–85	36–55	2.0–6.0	0.11–0.15	4.5–6.5	Low.
A–7, A–6	100	100	85–100	65–80	0.6–2.0	0.12–0.20	5.1–6.0	Low.
A–7, A–6, A–4	100	100	75–90	36–55	0.6–2.0	0.12–0.17	5.1–6.0	Low.
A–4	100	100	85–95	60–75	0.6–2.0	0.15–0.20	6.1–7.3	Low.
A–7	100	95–100	90–100	75–95	0.06–0.2	0.12–0.18	6.1–6.5	High.
A–7, A–6	100	100	90–100	70–80	0.2–0.6	0.15–0.20	6.1–6.5	Moderate.
A–4	100	95–100	70–85	40–55	2.0–6.0	0.11–0.15	4.5–7.3	Low.
A–7, A–6	100	95–100	85–100	70–95	0.6–2.0	0.12–0.20	4.5–6.0	Low.
A–7, A–6	100	100	75–90	36–60	0.6–2.0	0.12–0.17	4.5–6.0	Low.

TABLE 4.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	Classification	
	Bedrock	Seasonal high water table		USDA texture	Unified
	Ft	*Ft*	*In*		
Tallapoosa: TaD, TaF	1–5+	>5	0–8	Fine sandy loam	SM, ML
			8–16	Fine sandy clay loam	SC
			16–32	Sandy loam	SM
			32	Bedrock.	
Urban land: Estimates were not made because soil material is too variable.					
Vance: VaB, VaC, VaD	>4	>5	0–7	Sandy loam	SM
			7–42	Clay, sandy clay	CH, SC
			42–62	Sandy clay loam	SC, CL
*Wedowee: WdB, WdC, WdD, WeB, WeC, WeD. For the Louisburg part of WeB, WeC, WeD, see the Louisburg series.	>4	>5	0–7	Sandy loam	SM
			7–34	Sandy clay, sandy clay loam.	SC, MH
			34–56	Coarse sandy loam	SM
Wehadkee: Wh Subject to flooding.	>5	0	0–13	Loam	ML
			13–42	Sandy clay loam, fine sandy loam.	SC, CL
			42–61	Loamy sand, sandy loam, sandy clay.	SM, CL
Wickham: WkB, WkC, WkD	>5	>5	0–7	Fine sandy loam	SM, ML
			7–49	Sandy clay loam	SC, CL
			49–65	Sandy clay loam	SM, ML
Wilkes: WlC, WlD, WlF	2–6	>5	0–6	Fine sandy loam	SM, ML
			6–16	Clay, clay loam	CL, MH
			16–54	Loam	ML
			54	Bedrock.	

[1] For 1 to 10 days in spring.

capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage, and (2) the relative ease of excavating the material at borrow areas.

Sand is used in great quantities in many kinds of construction. The ratings in table 5 provide guidance about where to look for probable sources. A soil rated as a good or fair source of sand generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality of the deposit.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed, natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Dikes, levees, and other embankments require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Drainage for crops and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainage.

significant to engineering—Continued

Class.—Con.	Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
AASHO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
					In per hr	*In per in of soil*	*pH*	
A–4	100	100	70–85	45–55	0.20–2.0	0.11–0.15	4.5–5.5	Low.
A–6	100	100	85–95	40–50	0.60–2.0	0.12–0.17	4.5–5.5	Low.
A–2, A–4	98–100	95–100	60–70	30–40	0.6–2.0	0.10–0.14	4.5–5.5	Low.
A–4, A–2	100	100	60–70	30–40	2.0–6.0	0.10–0.14	4.5–6.0	Low.
A–7	100	100	85–100	45–95	0.06–0.2	0.12–0.18	4.5–5.5	Moderate.
A–6	100	100	80–90	36–55	0.2	0.12–0.17	4.5–5.5	Moderate.
A–2, A–4	80–100	80–100	60–70	30–40	2.0–6.0	0.10–0.14	4.5–6.0	Low.
A–7, A–6	100	100	80–95	36–60	0.6–2.0	0.12–0.18	4.5–5.5	Low.
A–2	100	95–100	55–70	25–35	0.6–2.0	0.10–0.14	4.5–5.5	Low.
A–4	100	100	85–95	60–75	2.0–6.0	0.15–0.20	5.6–6.5	Low.
A–4	100	100	70–90	36–55	0.6–2.0	0.11–0.17	5.6–6.5	Low.
A–6	100	100	50–95	15–60	6.0	0.06–0.18	5.6–6.5	Low.
A–4	100	100	70–85	40–55	2.0–6.0	0.11–0.15	5.1–6.0	Low.
A–6	90–95	90–95	80–90	36–55	0.60–2.0	0.12–0.17	5.1–6.0	Moderate.
A–6, A–2	100	100	60–90	30–55	0.60–2.0	0.10–0.17	5.1–6.0	Moderate.
A–4	100	100	70–85	40–55	2.0–6.0	0.11–0.15	5.6–7.3	Low.
A–6, A–7	100	100	90–100	70–95	0.2–0.60	0.12–0.20	5.6–7.3	Moderate.
A–4	100	100	85–95	60–75	0.2–0.60	0.15–0.20	5.6–7.3	Moderate.

Wildlife[5]

Wildlife is related to soils through an indirect relationship with plants. Each kind of wildlife is associated with given types of plant communities, and these in turn, are directly related to particular kinds of soil. It is through this three-way relationship of wildlife to plants to soils that interpretations for wildlife are made.

The soils of Forsyth County produce many kinds of plants that provide food, cover, and protection for many species of wildlife. Such upland game as squirrel, rabbit, fox, mourning dove, and songbirds are abundant in the county. Quail, deer, and woodchuck are also found but are less abundant. Among the furbearers are large populations of muskrats and opossum. Other wildlife, which are not abundant, are beaver, mink, and skunk. Among the waterfowl are wood duck, mallard, black duck, widgeon, ringneck, and greenwing teal. These birds are common along the Yadkin River and its tributaries during winter.

In table 6, on page 54, each of the soils mapped in the county has been rated for seven elements of wildlife habitat, and summary ratings have been made for three kinds of wildlife. The ratings are for the creation, maintenance, or improvement of the different habitat components. The ratings are well suited, suited, poorly suited, and unsuited, depending on the severity of limitations of a given soil. Among the soil properties considered are thickness of the surface layer and subsoil, flood hazard, drainage, available water capacity, and slope.

The ratings given are to be used as guidelines and do not provide analysis of a specific site. For example, a soil rated as good for grasses and legumes is suited to most species normally grown in the county. Further onsite investigation is needed in planning management.

The column heads in table 6 are briefly explained in the following paragraphs.

Grasses and legumes are plants that furnish food and cover for wildlife. The suitability rating reflects the suitability of the soil for various grasses and legumes. Examples are fescue, clover, shrub lespedeza, annual lespedeza, soybeans, ryegrass, lovegrass, and kudzu.

Grain crops are mainly farm crops that provide food

[5] By JOHN P. EDWARDS, biologist, Soil Conservation Service.

TABLE 5.—*Interpretations of engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The the instructions for referring to other series

Soil series and map symbols	Degree and kind of limitations for—				
	Septic tank absorption fields	Sewage lagoons	Light industries	Dwellings without basements	Sanitary landfill
Altavista: AlB	Severe: Seasonal high water table at a depth of about 2½ feet.	Severe: seasonal high water table at a depth of about 2½ feet.	Severe: infrequent flooding.	Severe: infrequent flooding.	Severe: seasonal high water table at a depth of 2½ feet.
Appling: ApB	Moderate: moderate permeability.	Moderate: moderate permeability; slope.	Moderate: slope.	Moderate: slope.	Slight
ApC	Moderate: moderate permeability; slope.	Severe: slope	Severe: slope	Moderate: slope.	Slight
Cecil: CcB	Moderate: moderate permeability.	Moderate: moderate permeability; slope.	Moderate: slope.	Moderate: Unified soil group is MH.	Severe: clayey subsoil.
CcC	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH.	Severe: clayey subsoil.
CcD	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH; slope.	Severe: clayey subsoil.
CeB2	Moderate: moderate permeability.	Moderate: moderate permeability; slope.	Moderate: Unified soil group is MH.	Moderate: Unified soil group is MH.	Severe: clayey subsoil.
CeC2	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH.	Severe: clayey subsoil.
Chewacla: Ch	Severe: very frequent flooding; seasonal high water table within 1½ feet of the surface.	Severe: very frequent flooding; seasonal high water table within 1½ feet of the surface.	Severe: very frequent flooding; seasonal high water table within 1½ feet of the surface.	Severe: very frequent flooding; seasonal high water table within 1½ feet of the surface.	Severe: very frequent flooding; seasonal high water table within 1½ feet of the surface.
Congaree: Co	Severe: very frequent flooding.	Severe: very frequent flooding.	Severe: very frequent flooding.	Severe: very frequent flooding.	Severe: very frequent flooding.
Cut and fill land: Cu. Too variable to rate.					
Enon: EnB	Severe: slow permeability.	Moderate: slope; bedrock at a depth of more than 4 feet.	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: clayey subsoil.

properties of the soils

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully that appear in the first column of this table]

	Suitability as source of—			Soil features affecting—		
Local roads and streets	Road fill	Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage for crops and pasture
Moderate: infrequent flooding.	Good	Poor: improbable source.	Fair: about 12 inches of suitable material.	Moderately rapid permeability.	Medium to low shear strength.	Seasonal high water table at a depth of about 2½ feet.
Moderate: Unified soil group is dominantly MH.	Fair: Unified soil group is dominantly MH.	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Low shear strength.	Well drained.
Moderate: Unified soil group is dominantly MH.	Fair: Unified soil group is dominantly MH.	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Low shear strength.	Well drained.
Moderate: Unified soil group is MH.	Fair: Unified soil group is MH.	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH.	Fair: Unified soil group is MH.	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH; slope.	Fair: Unified soil group is MH.	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH.	Fair: Unified soil group is MH.	Unsuited	Poor: about 6 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH.	Fair: Unified soil group is MH.	Unsuited	Poor: about 6 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: very frequent flooding.	Fair: Unified soil group is ML.	Unsuited	Good	Moderate permeability.	Low resistance to piping.	Seasonal high water table within 1½ feet of the surface.
Severe: very frequent flooding.	Fair: Unified soil group is ML, CL.	Poor: too many fines.	Good	Moderate permeability.	Low resistance to piping.	Features generally favorable.
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Slow permeability.	High compressibility, poor compaction characteristics.	Well drained.

TABLE 5.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitations for—				
	Septic tank absorption fields	Sewage lagoons	Light industries	Dwellings without basements	Sanitary landfill
Enon—Con.					
EnC	Severe: slow permeability.	Severe: slope; bedrock at a depth of about 4 feet.	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: clayey subsoil.
EnD	Severe: slow permeability.	Severe: slope; bedrock at a depth of about 4 feet.	Severe: slope; high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: clayey subsoil.
Gullied land: Gu. Too variable to rate.					
Hiwassee:					
HlB	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: slope; Unified soil group is MH, CH.	Moderate: Unified soil group is MH, CH.	Severe: clayey subsoil.
HlC	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH; slope.	Severe: clayey subsoil.
HlD	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH; slope.	Severe: clayey subsoil.
HlE	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: clayey subsoil.
HmB2	Moderate: moderate permeability.	Moderate: moderate permeability; slope.	Moderate: slope; Unified soil group is MH, CH.	Moderate: Unified soil group is MH, CH.	Severe: clayey subsoil.
HmC2	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH; slope.	Severe: clayey subsoil.
HmD2	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH; slope.	Severe: clayey subsoil.
Iredell: IrB	Severe: slow permeability.	Moderate: bedrock at a depth of 3 to 6 feet.	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: clayey subsoil; bedrock at a depth of 3 to 6 feet.
*Louisburg:					
LoD	Moderate: slope.	Severe: rapid permeability.	Severe: slope	Moderate: slope.	Severe: rapid permeability.
LoF	Severe: slope	Severe: slope; rapid permeability.	Severe: slope	Severe: slope	Severe: slope; rapid permeability.

See footnotes at end of table.

properties of the soils—Continued

	Suitability as source of—			Soil features affecting—		
Local roads and streets	Road fill	Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage for crops and pasture
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Slow permeability.	Low shear strength.	Well drained.
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Poor: about 6 inches of suitable material.	Slow permeability.	Low shear strength.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 7 inches of suitable material; slope.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: slope	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material; slope.	Slope: moderate permeability.	Slope; low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Moderate permeability.	Low shear strength: poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 5 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Fair: about 8 inches of suitable material.	Depth to bedrock.	High compressibility; low shear strength.	Moderately well drained.
Moderate: slope.	Slight	Poor: improbable source.	Poor: too sandy.	Rapid permeability.	Low resistance to piping.	Well drained to excessively drained.
Severe: slope	Poor: slope	Poor: improbable source.	Poor: too sandy.	Rapid permeability; slope.	Low resistance to piping.	Well drained to excessively drained.

TABLE 5.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitations for—				
	Septic tank absorption fields	Sewage lagoons	Light industries	Dwellings without basements	Sanitary landfill
Louisburg—continued					
LwE For Wedowee part of the LwE see WeC under the Wedowee series.	Severe: slope	Severe: rapid permeability.	Severe: slope	Severe: slope	Severe: slope; rapid permeability.
Madison:					
MaB	Moderate: bedrock at a depth of 3 to 5 feet or more.	Moderate: bedrock at a depth of 3 to 5 feet or more.	Moderate: slope.	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of 3 to 5 feet or more.
MaC	Moderate: bedrock at a depth of 3 to 5 feet or more.	Severe: slope	Severe: slope	Moderate: slope.	Severe: bedrock at a depth of 3 to 5 feet or more.
MaD	Moderate: bedrock at a depth of 3 to 5 feet or more.	Severe: slope	Severe: slope	Moderate: slope.	Severe: bedrock at a depth of 3 to 5 feet or more.
MaF	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
McB2	Moderate: bedrock at a depth of 3 to 5 feet or more.	Moderate: moderate permeability; bedrock at a depth of 3 to 5 feet or more.	Moderate: slope.	Moderate: Unified soil group is MH, CH.	Severe: bedrock at depth of 3 to 5 feet or more.
McC2	Moderate: bedrock at a depth of 3 to 5 feet or more.	Severe: slope	Severe: slope	Moderate: Unifield soil group is MH, CH.	Severe: bedrock at a depth of 3 to 5 feet or more.
McD2	Moderate: bedrock at a depth of 3 to 5 feet or more.	Severe: slope	Severe: slope	Moderate: slope.	Severe: bedrock at a depth of 3 to 5 feet or more.
Mecklenburg:					
MeB	Severe: slow permeability.	Moderate: slope; bedrock at a depth of about 4 feet.	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: bedrock at a depth of about 4 feet.
MeC	Severe: slow permeability.	Severe: slope	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: bedrock at a depth of about 4 feet.
MeD	Severe: slow permeability.	Severe: slope	Severe: slope; high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: bedrock at a depth of about 4 feet.
Pacolet:					
PaB	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: slope.	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.

properties of the soils—Continued

	Suitability as source of—			Soil features affecting—		
Local roads and streets	Road fill	Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage for crops and pasture
Severe: slope	Poor: slope	Poor: improbable source.	Poor: too sandy	Rapid permeability; slope.	Low resistance to piping.	Well drained to excessively drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: slope; Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: slope	Poor: slope	Unsuited	Poor: about 5 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; slope.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: slope; Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 3 to 5 feet; moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Bedrock at a depth of about 4 feet.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Bedrock at a depth of about 4 feet.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: high shrink-swell potential.	Poor: high shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Bedrock at a depth of about 4 feet.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Fair: about 9 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.

TABLE 5.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitations for—				
	Septic tank absorption fields	Sewage lagoons	Light industries	Dwellings without basements	Sanitary landfill
Pacolet—continued					
PaC	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.
PaD	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: slope; Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.
PaF	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
PcB2	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: slope.	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.
PcC2	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.
PcC3	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.
PcD2	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: Unified soil group is MH, CH.	Severe: bedrock at a depth of about 4 feet.
PcF2	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
PeE3, PuC, PuE	Too variable to rate.				
Tallapoosa:					
TaD	Severe: slope; bedrock at a depth of 1 to 5 feet.	Severe: slope	Severe: slope	Severe: bedrock at a depth of 1 to 5 feet.	Severe: bedrock at a depth of 1 to 5 feet.
TaF	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Vance:					
VaB	Severe: slow permeability.	Moderate: bedrock at a depth of about 4 feet.	Moderate: slope; moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.	Severe: bedrock at a depth of about 4 feet.
VaC	Severe: slow permeability.	Moderate: bedrock at a depth of about 4 feet.	Severe: slope	Moderate: slope; moderate shrink-swell potential.	Severe: bedrock at a depth of about 4 feet.
VaD	Severe: slow permeability.	Severe: slope	Severe: slope	Moderate: slope; moderate shrink-swell potential.	Severe: bedrock at a depth of about 4 feet.

properties of the soils—Continued

	Suitability as source of—			Soil features affecting—		
Local roads and streets	Road fill	Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage for crops and pasture
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Fair: about 9 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: slope	Poor: slope	Unsuited	Poor: slope; about 6 inches of suitable material.	Slope: moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 6 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 5 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: Unified soil group is MH, CH.	Fair: Unified soil group is MH, CH.	Unsuited	Poor: about 5 inches of suitable material.	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: slope	Severe: slope	Unsuited	Poor: slope	Moderate permeability.	Low shear strength; poor compaction characteristics.	Well drained.
Severe: slope	Poor: slope; less than about 3 feet of material.	Unsuited	Fair: slope	Moderate permeability.	Low resistance to piping.	Well drained.
Severe: slope	Poor: slope	Unsuited	Severe: slope	Moderate permeability.	Low resistance to piping.	Well drained.
Moderate: moderate shrink-swell potential.	Fair: moderate shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Features generally favorable.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: moderate shrink-swell potential.	Fair: moderate shrink-swell potential.	Unsuited	Poor: about 7 inches of suitable material.	Features generally favorable.	Low shear strength; poor compaction characteristics.	Well drained.
Moderate: moderate shrink-swell potential.	Fair: moderate shrink-swell potential.	Unsuited	Poor: about 6 inches of suitable material.	Features generally favorable.	Low shear strength; poor compaction characteristics.	Well drained.

TABLE 5.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitations for—				
	Septic tank absorption fields	Sewage lagoons	Light industries	Dwellings without basements	Sanitary landfill
*Wedowee: For Louisburg part of WeB, WeC, and WeD, see unit LwE under the Louisburg series.					
WdB	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: slope.	Slight	Severe: bedrock at a depth of 4 to 5 feet.
WdC	Moderate: moderate permeability.	Severe: slope	Severe: slope	Slight	Severe: bedrock at a depth of 4 to 5 feet.
WdD	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: slope.	Severe: bedrock at a depth of 4 to 5 feet.
WeB	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: slope.	Slight	Severe: bedrock at a depth of 4 to 5 feet.
WeC	Moderate: moderate permeability.	Severe: slope	Severe: slope	Slight	Severe: bedrock at a depth of 4 to 5 feet.
WeD	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: slope.	Severe: bedrock at a depth of 4 to 5 feet.
Wehadkee: Wh	Severe: seasonal high water table at the surface for 2 to 6 months; flooding.	Severe: seasonal high water table at the surface for 2 to 6 months; flooding.	Severe: seasonal high water table at the surface for 2 to 6 months; flooding.	Severe: seasonal high water table at the surface for 2 to 6 months; flooding.	Severe: seasonal high water table at the surface; flooding.
Wickham:					
WkB	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: slope.	Slight	Slight
WkC	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: slope.	Slight
WkD	Moderate: moderate permeability.	Severe: slope	Severe: slope	Moderate: slope.	Slight
Wilkes:					
WlC	Severe: moderately slow permeability.	Severe: bedrock at a depth of 2 to 6 feet.	Severe: slope	Moderate: slope; bedrock at a depth of 2 to 6 feet.	Severe: bedrock at a depth of 2 to 6 feet.
WlD	Severe: moderately slow permeability.	Severe: slope	Severe: slope	Moderate: slope; bedrock at a depth of 2 to 6 feet.	Severe: bedrock at a depth of 2 to 6 feet.
WlF	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

properties of the soils—Continued

	Suitability as source of—			Soil features affecting—		
Local roads and streets	Road fill	Sand	Topsoil	Pond reservoir areas	Dikes, levees, and other embankments	Drainage for crops and pasture
Slight	Good	Unsuited	Fair: about 9 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Slight	Good	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Moderate: slope.	Good	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Slight	Good	Unsuited	Fair: about 9 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Slight	Good	Unsuited	Poor: about 7 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Moderate: slope.	Good	Unsuited	Poor: about 6 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Severe: poorly drained; flooding.	Poor: poorly drained.	Unsuited	Poor: poorly drained.	Moderate permeability.	Low resistance to piping.	Well drained.
Slight	Good	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Moderate: slope.	Good	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Moderate: slope.	Good	Unsuited	Fair: about 8 inches of suitable material.	Moderate permeability.	Medium to low shear strength.	Well drained.
Moderate: bedrock at a depth of 2 to 6 feet.	Moderate: moderate shrink-swell potential.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 2 to 6 feet.	Low shear strength.	Well drained.
Moderate: bedrock at a depth of 2 to 6 feet.	Fair: moderate shrink-swell potential.	Unsuited	Poor: about 6 inches of suitable material.	Bedrock at a depth of 2 to 6 feet.	Low shear strength.	Well drained.
Severe: slope	Poor: slope	Unsuited	Poor: slope	Bedrock at a depth of 2 to 6 feet.	Low shear strength.	Well drained.

TABLE 6.—*Suitability of the soils for elements*

Soils	Elements of wildlife habitat		
	Grasses and legumes	Grain crops	Wild herbaceous upland plants
Altavista fine sandy loam, 1 to 6 percent slopes	Well suited	Well suited	Well suited
Appling sandy loam, 2 to 6 percent slopes	Well suited	Well suited	Well suited
Appling sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Cecil sandy loam, 2 to 6 percent slopes	Well suited	Well suited	Well suited
Cecil sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Cecil sandy loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Cecil clay loam, 2 to 6 percent slopes, eroded	Suited	Suited	Well suited
Cecil clay loam, 6 to 10 percent slopes, eroded	Suited	Poorly suited	Well suited
Chewacla loam	Poorly suited	Unsuited	Poorly suited
Congaree complex	Suited	Poorly suited	Suited
Cut and fill land.			
Too variable to be rated.			
Enon fine sandy loam, 2 to 6 percent slopes	Well suited	Suited	Well suited
Enon fine sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Enon fine sandy loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Gullied land.			
Too variable to be rated.			
Hiwassee loam, 2 to 6 percent slopes	Well suited	Well suited	Well suited
Hiwassee loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Hiwassee loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Hiwassee loam, 15 to 25 percent slopes	Suited	Poorly suited	Well suited
Hiwassee clay loam, 2 to 6 percent slopes, eroded	Suited	Suited	Well suited
Hiwassee clay loam, 6 to 10 percent slopes, eroded	Suited	Poorly suited	Well suited
Hiwassee clay loam, 10 to 15 percent slopes, eroded	Suited	Poorly suited	Well suited
Iredell fine sandy loam, 2 to 6 percent slopes	Well suited	Suited	Well suited
Louisburg loamy sand, 6 to 15 percent slopes	Poorly suited	Unsuited	Poorly suited
Louisburg loamy sand, 15 to 45 percent slopes	Unsuited	Unsuited	Poorly suited
Louisburg-Wedowee complex, 15 to 25 percent slopes	Unsuited	Unsuited	Suited
Madison fine sandy loam, 2 to 6 percent slopes	Well suited	Well suited	Well suited
Madison fine sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Madison fine sandy loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Madison fine sandy loam, 15 to 45 percent slopes	Poorly suited	Unsuited	Well suited
Madison clay loam, 2 to 6 percent slopes, eroded	Suited	Suited	Well suited
Madison clay loam, 6 to 10 percent slopes, eroded	Suited	Poorly suited	Well suited
Madison clay loam, 10 to 15 percent slopes, eroded	Suited	Poorly suited	Well suited
Mecklenburg loam, dark surface variant, 2 to 6 percent slopes	Well suited	Suited	Well suited
Mecklenburg loam, dark surface variant, 6 to 10 percent slopes	Suited	Suited	Well suited
Mecklenburg loam, dark surface variant, 10 to 15 percent slopes	Suited	Suited	Well suited
Pacolet fine sandy loam, 2 to 6 percent slopes	Well suited	Suited	Well suited
Pacolet fine sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Pacolet fine sandy loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Pacolet fine sandy loam, 15 to 45 percent slopes	Poorly suited	Unsuited	Well suited
Pacolet clay loam, 2 to 6 percent slopes, eroded	Suited	Poorly suited	Well suited
Pacolet clay loam, 6 to 10 percent slopes, eroded	Suited	Poorly suited	Well suited
Pacolet clay loam, 10 to 15 percent slopes, eroded	Suited	Poorly suited	Well suited
Pacolet clay loam, 15 to 45 percent slopes, eroded	Unsuited	Unsuited	Well suited
Pacolet clay loam, 6 to 10 percent slopes, severely eroded	Poorly suited	Unsuited	Suited
Pacolet complex, 10 to 25 percent slopes, severely eroded	Poorly suited	Unsuited	Suited
Pacolet-Urban land complex, 2 to 10 percent slopes.			
Too variable to be rated.			
Pacolet-Urban land complex, 10 to 25 percent slopes.			
Too variable to be rated.			
Tallapoosa fine sandy loam, 6 to 15 percent slopes	Poorly suited	Poorly suited	Suited
Tallapoosa fine sandy loam, 15 to 45 percent slopes	Poorly suited	Unsuited	Suited
Vance sandy loam, 2 to 6 percent slopes	Well suited	Well suited	Well suited
Vance sandy loam, 6 to 10 percent slopes	Suited	Suited	Well suited
Vance sandy loam, 10 to 15 percent slopes	Suited	Suited	Well suited
Wedowee sandy loam, 2 to 6 percent slopes	Well suited	Suited	Well suited
Wedowee sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Wedowee sandy loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Wedowee-Louisburg complex, 2 to 6 percent slopes	Suited	Poorly suited	Suited
Wedowee-Louisburg complex, 6 to 10 percent slopes	Suited	Poorly suited	Suited
Wedowee-Louisburg complex, 10 to 15 percent slopes	Suited	Poorly suited	Suited
Wehadkee soils	Poorly suited	Unsuited	Poorly suited
Wickham fine sandy loam, 2 to 6 percent slopes	Well suited	Well suited	Well suited
Wickham fine sandy loam, 6 to 10 percent slopes	Well suited	Suited	Well suited
Wickham fine sandy loam, 10 to 15 percent slopes	Well suited	Suited	Well suited
Wilkes soils, 6 to 10 percent slopes	Poorly suited	Poorly suited	Suited
Wilkes soils, 10 to 15 percent slopes	Poorly suited	Poorly suited	Suited
Wilkes soils, 15 to 45 percent slopes	Poorly suited	Unsuited	Suited

of wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Continued				Kinds of wildlife		
Wetland food and cover plants	Hardwood woody plants	Coniferous woody plants	Shallow water development	Openland	Woodland	Wetland
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Suited	Well suited	Poorly suited	Unsuited	Poorly suited	Well suited	Suited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Poorly suited	Suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Unsuited	Suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Unsuited	Suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Poorly suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Poorly suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Poorly suited	Well suited	Unsuited.
Unsuited	Well suited	Suited	Unsuited	Poorly suited	Well suited	Unsuited.
Unsuited	Well suited	Suited	Unsuited	Poorly suited	Well suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Poorly suited	Suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Poorly suited	Suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Well suited	Well suited	Poorly suited	Unsuited	Poorly suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Well suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Poorly suited	Suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Poorly suited	Suited	Unsuited.
Unsuited	Suited	Suited	Unsuited	Poorly suited	Suited	Unsuited.

for wildlife. The suitability rating reflects the suitability of the food for wildlife and the suitability of the soil, under good management, for these crops. Examples are corn, dove proso millet, browntop millet, wheat, and oats.

Wild herbaceous upland plants are native or introduced perennial plants that furnish food and cover for game. The rating reflects the suitability of the soil for these plants under natural conditions with little or no management. Examples are pokeweed, tickclover, ragweed, and wild strawberries.

Wetland food and cover plants are wild herbaceous plants and trees that are mainly associated with wetland areas. The suitability rating reflects the suitability of the soil for these plants under natural conditions. Examples are rushes, sedges, smartweed, cattails, water tupelo-gum, swamp tupelo-gum, cypress, and Carolina ash.

Hardwood woody plants are hardwood trees, shrubs, and vines that produce fruit, buds, nuts, and foliage. These plants are used by wildlife for both food and cover. Examples are oaks, hickory, grapes, autumn-olive, pyracantha, dogwood, poplar, and multiflora rose. The rating reflects the suitability of the soil for plants of this kind, but it does not reflect management that may be needed and applied.

Coniferous woody plants are mainly pines. Cover is the main benefit provided to wildlife by these plants, although the seeds are used as food to some extent. The suitability rating reflects the ability of the soil to produce these plants under natural conditions.

Shallow water development refers to the suitability of the soil for development of shallow ponds or flooded areas. In most places, a great deal of management is required to create or improve this habitat component. This habitat component deviates somewhat from the direct relationship of soils to plants to wildlife. It is listed, however, because of its primary importance to many species of wildlife.

Openland wildlife are birds and mammals that are generally associated with the edges of open areas. Mourning dove, quail, red fox, cottontail rabbit, woodchuck, and many species of songbirds are typical examples of wildlife that one might expect to find in this group. Openland areas are also important to woodland wildlife, and this interrelationship must be considered when planning a management program.

Woodland wildlife are found mainly in woodland communities. Examples are deer, marsh rabbit, and squirrel.

Wetland wildlife are birds and mammals that are found mainly in such wetland communities as swamps, marshes, or ponds. Examples are muskrat, mink, raccoon, redwing blackbird, and various ducks.

Woodland [6]

This section contains a brief description of the forests of Forsyth County and information concerning the relationship between soils and trees. It includes interpretations that make the soil survey more useful to forest landowners and managers in developing and harvesting woodland resources.

[6] By JOHN E. WIGGINS, JR., forester, Soil Conservation Service.

Before the first planned settlement in November 1753, virtually all of the land area that is now Forsyth County was covered by virgin forest. Many kinds of needleleaf and broadleaf trees grew in this forest. Shade-tolerant trees, shrubs, and woody vines made up the understory. On north-facing slopes, particularly in the more rugged terrain, mountain laurel was conspicuous in the understory.

The uplands and high stream terraces supported stands of variable mixtures of red, white, black, chestnut, southern red, scarlet, and post oaks; pignut and mockernut hickories; yellow-poplar; American chestnut; sweetgum; blackgum; winged elm; redcedar; shortleaf pine; Virginia pine; and in some areas, white pine. Dogwood, holly, sourwood, and shadblow (serviceberry) were present in the understory.

The deep, fertile, better-drained soils of the flood plains and low stream terraces along the Yadkin River and its main tributaries supported stands of red, white, and swamp chestnut oaks; shagbark and bitternut hickories; American beech; yellow-poplar; black walnut; sugarberry; American and slippery elms; white and green ashes; red, silver, and southern sugar maples; sweetgum; blackgum; sycamore; river birch; and some shortleaf and white pines. Hop hornbeam, blue beech, holly, red mulberry, and persimmon grew in the understory of these stands. On the more poorly drained soils grew black willow, red maple, sycamore, green ash, sweetgum, river birch, and water oak.

Except for a few large tracts in steep, rugged terrain, mostly in the northeastern and northwestern parts of the county and along the Yadkin River, most of the original forest has been subjected to repeated disturbance since 1753. Nearly all of the tillable area has been cleared at some time or other, and some areas have been cleared more than once. Early clearing for farming and wood products was followed by abandonment of many of the fields because natural fertility of the soils declined. New areas were cleared, and later they, too, were abandoned. Shortleaf and Virginia pines invaded these cleared areas and pure stands or mixtures of these two species became established. Many of these second-growth stands have been cut to meet an increasing demand for wood products, and the land has been returned to cultivation. As a result of these repeated disturbances, most of the original forest has been converted to stands of pine and mixed pine and hardwoods or is in farm, industrial, urban, or other uses.

According to the 1966 North Carolina Conservation Needs Inventory, commercial forests now occupy 115,037 acres, or approximately 42.4 percent of the land area of Forsyth County, and are still one of its most important natural resources. In 1964, about 10 percent of the forested area was in stands of shortleaf pine, 21 percent in Virginia pine, 19 percent in mixed oaks and pine, 45 percent in white oak, red oak, and hickory, and 5 percent in water oak, gum, and other hardwoods. More than 99 percent of the forested land is held by farmers and other private owners (*9*). Many of these privately owned tracts are less than 100 acres in size.

Woodland suitability groups

The soils of Forsyth County have been placed in 11

woodland suitability groups to assist landowners in planning for productive use of the soils and management of woodlands. A woodland suitability group consists of soils that have comparable potential productivity and similar limitations, produce similar tree crops, and require the same management and conservation practices. The woodland suitability group to which each mapping unit is assigned is listed in the "Guide to Mapping Units" at the end of this publication and at the end of the description of the mapping unit in the section "Descriptions of the Soils."

A symbol consisting of three elements, except for some severely eroded soils, is used to designate each woodland suitability group. The first element in the symbol is an Arabic numeral that denotes the relative productive potential of soils in the group. It expresses site quality based on one or more commercially important forest tree species. The numeral 1 indicates a very high potential productivity; the numeral 2 indicates high productive potential; the numeral 3, moderately high; the numeral 4, moderate, and the numeral 5 indicates a low potential.

The second element in the symbol is a lowercase letter that denotes the soil property or physiographic characteristic that is the main cause of hazards, limitations, or restrictions of the soils for woodland use or management. The letter "w" indicates excessive wetness. This designation indicates that excess water, either seasonally or year round, causes significant limitations for woodland use. The excess water may result from restricted drainage, a seasonal high water table, or flooding. These soil properties adversely affect either development or management of the stand. The letter "c" indicates that management restrictions or limitations are caused mainly by the kind or amount of clay in the upper part of the soil profile. The letter "r" indicates soils that have limitations caused solely by relief or slope. The letter "o" indicates that there are no significant soil-related limitations. Some soils have more than one limiting characteristic. For such soils, priority was assigned in the order that the characteristics are listed in the foregoing sentences.

The third element in the symbol is an Arabic numeral that denotes the degree of hazards or limitations and the general suitability of the soils for certain kinds of trees.

The numeral 1 indicates that the soils have no significant management limitations and they are best suited to needleleaf trees, such as pines.

The numeral 2 indicates that the soils have moderate limitations and are best suited to needleleaf trees.

The numeral 3 indicates that the soils have one or more severe limitations and are best suited to needleleaf trees.

The numeral 7 indicates that the soils have no significant limitations to management and are well suited to either needleleaf or broadleaf trees.

The numeral 8 indicates that the soils have slight to moderate limitations and are well suited to needleleaf or broadleaf trees.

The numeral 9 indicates that the soils have one or more severe limitations to management, but are suited to needleleaf or broadleaf trees.

A fourth element, the letter "e", is used to denote some severely eroded soils that have been placed in separate subgroups.

Table 7 includes a brief description of the soils in each woodland suitability group in Forsyth County. It also gives for each suitability group the potential productivity of certain trees, major management hazards and limitations, and preferred tree species for planting and managing.

Potential productivity of a soil is expressed numerically as site class for a given tree species. Site class is based on site index. Site index for most species is the average of the total heights, measured in feet, of the best (dominant and codominant) trees in an even-aged stand when they reach 50 years of age. For some species heights at other ages, such as 25 or 35 years, may be used. Site index was rounded to the nearest 10-foot interval to determine site class. By consulting published research data, site class can be converted to expected yields per acre in terms of board feet, cubic feet, or cords (*5, 6*).

Erosion hazard is rated as slight, moderate, or severe. The ratings assigned each soil are based on the erodibility of the particular soil, depth of the soil, and the slope.

Equipment restrictions (*relative trafficability*) include the physical characteristics of the soils and the topographic features that limit or prohibit the use of equipment commonly employed in constructing access roads, planting trees, harvesting forest products, controlling undesirable vegetation, controlling fire, or other forest management operations. Excess water restricts the use of equipment on some soils in Forsyth County. On other soils, clayey textures, together with steepness, in some instances, limits equipment use.

A rating of *slight* indicates that conventional equipment may be used any time during the year, except for short periods of heavy rainfall and that the soils are moderately well drained to well drained, they are not subjected to prolonged flooding or excessive surface water, and they have slopes of less than 15 percent.

Moderate indicates that conventional equipment can be used from March to December; that occasional flooding may occur; that the seasonal high water table is generally below the surface, or seldom above the surface for extended periods; and that slopes are less than 45 percent.

Severe indicates that the use of conventional equipment is limited to the driest months, or to periods between floods or that slopes exceed 45 percent.

Seedling mortality refers to the expected degree of loss of tree seedlings, established by planting, direct seeding, or natural seeding, as a result of adverse soil characteristics or topographic features. In evaluating mortality, it is assumed that plant competition is not a limiting factor. For planted seedlings, it is assumed that healthy seedlings of the proper grade have been properly planted. An adequate seed source is assumed for seedlings established by natural reseeding. Normal environmental factors are assumed for both planted and naturally established seedlings.

A rating of *slight* indicates that ordinarily the average mortality will not exceed 25 percent. *Moderate* indicates that mortality will average 25 to 50 percent. *Severe* indicates that mortality will exceed 50 percent.

TABLE 7.—*Use and management of the soils by woodland suitability groups*

Woodland suitability group and map symbols	Potential productivity		Management hazards and limitations			Preferred tree species for planting and managing	
	Tree species	Site class [1]	Erosion hazard	Equipment restrictions	Seedling mortality	Broadleaf	Needleleaf
Group 1o7. Nearly level, well-drained, loamy soils; subject to flooding; very high potential productivity; suitable for broadleaf and needleleaf trees. Congaree: Co.	Green ash Black cherry Cottonwood Water oak Willow oak Loblolly pine Shortleaf pine White pine Sweetgum Sycamore Black walnut Yellow-poplar	90 90 110 90 90 90 80 90 100 90 100 110	Slight	Slight	Slight	White ash, eastern cottonwood, cherrybark oak, northern red oak, sweetgum, sycamore, black walnut, yellow-poplar.	Loblolly pine, shortleaf pine, white pine.
Group 1w8. Nearly level, somewhat poorly drained, loamy soils; subject to flooding; very high potential productivity; suitable for broadleaf and needleleaf trees. Chewacla: Ch.	Green ash White ash Cottonwood Scarlet oak Southern red oak Water oak Willow oak Sweetgum Sycamore Yellow-poplar	100 80 100 90 90 90 90 100 90 100	Slight	Moderate	Moderate	Green ash, white ash, eastern cottonwood, cherrybark oak, northern red oak, sweetgum, sycamore, yellow-poplar.	Loblolly pine, white pine.
Group 1w9. Nearly level, poorly drained, loamy soils; subject to flooding; very high potential productivity; suitable for water-tolerant broadleaf and needleleaf trees. Wehadkee: Wh.	Green ash White ash Cottonwood Red maple Water oak Willow oak Loblolly pine Sweetgum Sycamore Yellow-poplar [2]	100 90 90 90 90 90 100 90 90 100	Slight	Severe [3]	Severe [3]	Green ash, eastern cottonwood, cherrybark oak, water oak, willow oak, sweetgum, sycamore, yellow-poplar. [4]	Loblolly pine, white pine. [4]
Group 2w8. Nearly level to gently sloping, moderately well drained soils; some areas subject to flooding; high potential productivity; suitable for broadleaf and needleleaf trees. Altavista: AlB.	White oak Loblolly pine Shortleaf pine White pine Sweetgum Sycamore Yellow-poplar	80 90 80 90 90 90 100	Slight	Moderate	Slight	White ash, cherrybark oak, northern red oak, sweetgum, sycamore, black walnut, yellow-poplar.	Loblolly pine, shortleaf pine, white pine.
Group 3o7. Gently sloping to strongly sloping, well-drained to excessively drained soils; moderately high productivity; suitable for broadleaf and needleleaf trees. Appling: ApB, ApC. Cecil: CcB, CcC, CcD, CeB2, CeC2. Hiwassee: HlB, HlC, HlD, HmB2, HmC2, HmD2. Louisburg: LoD. Madison: MaB, MaC, MaD, McB2, McC2, McD2. Pacolet: PaB, PaC, PaD, PcB2, PcC2, PcD2. Vance: VaB, VaC, VaD. Wedowee: WdB, WdC, WdD, WeB, WeC, WeD. Wickham: WkB, WkC, WkD.	Red oak White oak Loblolly pine Shortleaf pine Virginia pine White pine Sweetgum Yellow-poplar	70–80 70–80 80 70 70+ 80 80	Slight	Slight	Slight	Northern red oak, white oak, yellow-poplar.	Loblolly pine, shortleaf pine, Virginia pine, white pine.

TABLE 7.—*Use and management of the soils by woodland suitability groups*—Continued

Woodland suitability group and map symbols	Potential productivity		Management hazards and limitations			Preferred tree species for planting and managing	
	Tree species	Site class [1]	Erosion hazard	Equipment restrictions	Seedling mortality	Broadleaf	Needleleaf
Group 3r8. Moderately steep to steep, well drained to excessively drained soils; moderately high productivity; suitable for broadleaf and needleleaf trees. Hiwassee: HlE. Louisburg: LoF, LwE. Madison: MaF. Pacolet: PaF, PcF2.	Red oak White oak Loblolly pine Shortleaf pine Virginia pine White pine Sweetgum Yellow-poplar	70–80 70–80 80 70 70+ 80 80 90	Moderate	Moderate	Slight	Northern red oak, white oak, yellow-poplar.	Loblolly pine, shortleaf pine, white pine.
Group 4o1. Gently sloping to strongly sloping, well-drained, clayey or loamy, or shallow soils; moderate productivity; best suited for needleleaf trees. Enon: EnB, EnC, EnD. Mecklenburg: MeB, MeC, MeD. Tallapoosa: TaD. Wilkes: WlC, WlD.	Red oak White oak Loblolly pine Shortleaf pine Virginia pine Yellow-poplar	70 70 70 60 60 80	Slight	Slight	Slight	None recommended.	Loblolly pine, Virginia pine, white pine, eastern redcedar.
Group 4r2. Steep, well-drained loamy or clayey, shallow soils; moderate productivity; best suited for needleleaf trees. Tallapoosa: TaF. Wilkes: WlF.	Red oak White oak Loblolly pine Shortleaf pine Virginia pine	70 70 70 60 60	Moderate	Moderate	Slight	None recommended.	Loblolly pine, Virginia pine, white pine, eastern redcedar.
Group 4c2. Gently sloping, moderately well drained clayey soils; moderate productivity; best suited for needleleaf trees. Iredell: IrB.	White oak Loblolly pine Shortleaf pine Eastern redcedar	50 70 60 40	Slight	Moderate	Moderate	None recommended.	Loblolly pine, eastern redcedar.
Group 4c2e. Sloping, well-drained, severely eroded soils; moderate productivity; best suited for needleleaf trees. Pacolet: PcC3.	Red oak White oak Loblolly pine Shortleaf pine Virginia pine	60 60 70 60 60	Moderate	Moderate	Moderate	None recommended.	Loblolly pine, Virginia pine, white pine.
Group 4c3e. Strongly sloping to moderately steep, well-drained, severely eroded soils; moderate productivity; best suited for needleleaf trees. Pacolet: PeE3.	Red oak White oak Loblolly pine Shortleaf pine Virginia pine	70 60 70 60 60	Severe	Severe	Moderate	None recommended.	Loblolly pine, Virginia pine.

[1] Site class is the numerical designation of the relative potential productivity of the soils for the trees shown in the table. It is based on site index which is the average of the total heights measured in feet, of the dominant and codominant trees in an even-aged stand at age 50. Site index was rounded to the nearest 10-foot interval to determine site class. For some trees, especially broadleaf species, site class is based on the comparative site class of other species on the same soil.

[2] Potential productivity is attainable only on soils that have adequate surface drainage.

[3] Moderate on soils with adequate drainage.

[4] Tree planting is feasible only on areas with adequate surface drainage.

Preferred tree species for planting and managing are shown by listing the principal commercial species that should be favored in existing stands as well as the species that are suitable for planting. Preferred tree species were selected on the basis of their growth rates and the quality, value, and general marketability of the products obtained from each.

Formation and Classification of the Soils

The factors that have affected the formation and composition of the soils in Forsyth County are discussed in this section. The soils are also placed in the categories of classification.

Factors of Soil Formation

Soil is the product of the combined effect of parent material, climate, plant and animal life, relief, and time. The characteristics of a soil at any place depends upon a combination of these five environmental factors. All of these factors affect the formation of every soil. The relative importance of each factor differs from place to place. One or two of the factors may dominate in the formation of a specific soil and govern most of its properties, but in every soil the way the five factors have combined in its development determines the present characteristics.

Parent material

Parent material is the mass from which a soil formed and is mainly responsible for the chemical and mineralogical composition of the soils. The parent materials in Forsyth County vary in mineral and chemical composition and in physical characteristics. A difference, such as texture, can be determined in the field, whereas differences in mineralogical composition are determined only by careful laboratory analysis. Many differences in the soil reflect the original differences in the characteristics of the geological materials.

Parent materials of soils in Forsyth County are in two broad classes: (1) materials residual from the weathering of underlying rock, and (2) materials transported by water from residual material or soils in the watershed.

The rocks underlying the soils in the county are mainly gneiss and schist along with large intrusions of granite along the southern border and southeastern corner of the county (*4*). There are minor intrusions of hornblende gneiss, hornblende schist, and other basic rocks throughout the county.

Appling, Cecil, Louisburg, Vance, and Wedowee soils formed in residuum weathered from granite, gneiss, and other acidic rocks that are high in quartz. Madison and Tallapoosa soils formed in residuum weathered from mica schist, mica gneiss, and quartz mica schist. Pacolet soils formed in material weathered from granite, schist, and mica gneiss. Enon, Mecklenburg, and Wilkes soils formed in residuum weathered from mixed acidic and basic rock. Parent material of Hiwassee soils is material weathered from mixed acid and basic rocks and old alluvium. Altavista and Wickham soils formed in old alluvium. Congaree, Chewacla, and Wehadkee soils formed in recent alluvial deposits along streams and drainageways.

Climate

Climate affects the physical, chemical, and biological relationships in the soil mainly through the influence of precipitation and of temperature. Water dissolves minerals, is necessary for biological activity, and transports minerals and organic residues through the soil profile. The amount of water that actually moves down through the soil over a broad area is dependent mainly on the amount and duration of rainfall, relative humidity, evapotranspiration, length of the frost-free period, and permeability of the soil. Temperature influences the kind and growth of organisms and the speed of physical and chemical reaction in the soils.

Forsyth County is warm and humid. The average annual temperature is 59.5° F. Average monthly temperatures range from 41° in December and January to 78° in July. Precipitation is well distributed and averages 44.2 inches per year. The relatively mild temperature and the abundant moisture causes rapid decomposition of organic matter and speeds up chemical reactions in the soil. The fairly high level of rainfall leaches out soluble bases, and the less soluble fine materials are moved deeper in the soil.

The most important influence of climate on the soils is the alteration of the soil material by temperature changes and precipitation.

Plant and animal life

The plants, animals, and other organisms that live on and in the soil influence soil development. They determine the kinds and amounts of organic material and the way it is incorporated in the soil. They help transfer nutrients and soil material from one part of the soil to another.

They affect the gains and losses of organic-matter content and plant nutrients in the soils and also have an effect on soil structure, soil porosity, and certain other characteristics of the soil.

The county originally was covered mostly with hardwood trees. As the fallen leaves, twigs, roots, and whole plants decayed, plant nutrients and organic acids were released and moved down through the soil. Roots took up some of the nutrients, and organic acids dissolved some of the less soluble soil components and increased the rate of leaching of inorganic materials.

The effect of the organic acids on soil formation is conditioned by the climate and other factors. Organic matter decays more rapidly in well-drained soils, such as Cecil, Appling, and Hiwassee soils. The decay of organic matter is slower on wetter soils, such as Wehadkee and Chewacla because the oxidation process is retarded by excess moisture. Therefore, these soils have a higher content of organic matter in their surface layer.

Small animals, insects, earthworms, and microorganisms affect the formation of soils by mixing organic matter in the soil and by helping to break down plant remains. Small animals mix soil by burrowing. Insects and earthworms feed on organic matter and slowly but continually mix the soil material and per-

haps alter it chemically. Micro-organisms hasten the weathering of rocks and the decomposition of organic matter.

Relief

Relief is largely determined by the underlying rock formations, the geologic history of the area, and the landscape development through slope retreat. It influences soil formation through its effect on runoff, movement of water within the soil, plant cover, and, to some extent, soil temperature.

In Forsyth County, the slope ranges from nearly level to steep. The smoother soils on uplands, such as Cecil, Appling, and Hiwassee soils have a fairly thick, well-defined profile, but soils that are like the Wilkes and Pacolet soils which are mainly steeper, have a thinner, more weakly developed profile.

Relief also affects the natural drainage of the soils. The soils on uplands are mostly well drained, but many of the nearly level soils on flood plains are somewhat poorly drained and poorly drained.

Time

Soil profiles require a long time to develop. Many factors affect soil formation. Thus, less time is required to develop a soil in a warm, humid region than in a dry, cold region.

Some soil characteristics reflect differences in the age of the soil. In Forsyth County the old soils generally have a deeper, better defined profile than young soils. The older Cecil, Appling, and Hiwassee soils on the smoother uplands have a deep profile and well-defined horizons, but young soils that are like the Congaree, Chewacla, and Wehadkee soils on the flood plains, have not been in place long enough to develop well-defined horizons.

Classification of the Soils

The system of classification discussed in this section is that adopted by the Soil Conservation Service as standard for all soil surveys in the United States effective January 1, 1965 (*8*). This system has six categories. Beginning with the most inclusive, the categories are the order, suborder, great group, subgroup, the family, and the series. Table 8 gives the classification of the soils of Forsyth County according to these categories. Placement of some of the series, particularly in the families, may change as more precise information becomes available.

General Nature of the County

Possibly the first permanent settlement in what is now Forsyth County began in 1740, but the first organized settlement was in 1753. This settlement was on a tract of 100,000 acres in "the three forks of Muddy Creek." The present county area was given the name of Forsyth in 1849 (*3*). The county seat is Winston-Salem.

Farming, education, and government have contributed to the growth of this county, and industry has played a major role in its development. Early growth was linked with the tobacco and cigarette industry. The first tobacco factory was started in 1872. In later years there has been diversification in industry. Today the leading industries are tobacco, electronics, hosiery, textiles, and beer. More than 40,000 people are employed by industry in the county. In most families living on farms in the county, someone is working off the farm. Industry has provided a large part of the income in the county.

Among the transportation facilities serving the county are three railroads and 16 trucking terminals as well as commercial jet and charter airlines.

Physiography, Relief, and Drainage

Forsyth County lies in the Piedmont physiographic province. The interstream areas represent a peneplain that has been dissected by moderately swift streams. Most of these streams flow southward and southwestward. The topography is gently rolling to hilly, and the interstream areas are fairly broad.

TABLE 8.—*Classification of the soils*

Series	Family	Subgroup	Order
Altavista	Fine-loamy, mixed, thermic	Aquic Hapludults	Ultisols.
Appling	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Cecil	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Chewacla	Fine-loamy, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Congaree	Fine-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Enon	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Hiwassee[1]	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Iredell	Fine, montmorillinitic, thermic	Typic Hapludalfs	Alfisols.
Louisburg	Coarse-loamy, mixed, thermic	Ruptic-Ultic Dystrochrepts	Inceptisols.
Madison	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Mecklenburg, dark surface variant	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Pacolet	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Tallapoosa	Loamy, micaceous, thermic, shallow	Ochreptic Hapludults	Ultisols.
Vance	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Wedowee	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Wehadkee	Fine-loamy, mixed, nonacid, thermic	Typic Fluvaquents	Entisols.
Wickham	Fine-loamy, mixed, thermic	Typic Hapludults	Ultisols.
Wilkes	Loamy, mixed, thermic, shallow	Typic Hapludalfs	Alfisols.

[1] Some of the Hiwassee soils in the survey area have higher color values in the lower part of the argillic horizon than is typical for the series, and they are taxadjuncts.

The average elevation of the county is about 870 feet above sea level and the highest point is 1,105 feet west of Rural Hall, and the lowest elevation is less than 700 feet where the Yadkin River leaves the county.

The topography of the county has been greatly altered by erosion. In most places there is a thick layer of soil and soft, weathered rock underlain by bedrock. In some parts of the county, road cuts expose this soft, weathered material to a depth of more than 20 feet. Stone lines in many places, at varying depths in the soil material, indicate that repeated cutting and filling have occurred until the present landscape of broad, gently sloping ridges and smooth side slopes has become more or less stable.

About 80 percent of the acreage of the county is drained by the Yadkin River and its tributaries, the most important of which are Salem Creek, Muddy Creek, South Fork (of Muddy Creek), North Fork (of Muddy Creek), and Abbotts Creek. Most of the remaining 20 percent is in the northeastern corner of the county and is drained by several northward-flowing tributaries of the Dan River. The principal streams of this area are Belews Creek, East Belews Creek, and West Belews Creek. A very small area northeast of Kernersville drains into Haw River and a small area southeast of Kernersville drains into Deep River.

Water Supply

In Forsyth County, for the present, the municipal and domestic water supply is ample, but demand exceeds the rate at which facilities can get it to the user. Problems in obtaining a supply of water from wells in the areas of Clemmons, Vienna, Oldtown, and Lewisville have demonstrated the need for public or community systems that supplant the individual wells that are now the source of water for county residents. The current sources of water are as follows:

Winston-Salem receives water from Salem Lake and Yadkin River.

Kernersville receives water from two lakes.

Rural Hall receives water from three deep wells.

Walkertown receives water from three deep wells.

Old Richmond receives water from the Yadkin River.

Thirteen large private systems receive water from deep wells.

There are four public water systems proposed, planned, or constructed that will purchase water from the Winston-Salem water supplier (*2*).

Climate [7]

Forsyth County is in distinctly rolling country, but its variations in elevation are not large. Most of the county is at elevations between 800 and 1,000 feet above mean sea level. The lowlands along the Yadkin River at the southwestern edge of the county and the beds of some other streams within the county are at elevations of about 700 feet. A few high points in the northwestern part of the county are at elevations of more than 1,000 feet. These features, as well as higher elevations to the north and west, in addition to latitude, distance from the ocean, and position on the continent are the principal factors that determine the climate of the county.

Table 9 gives temperature and precipitation data for Forsyth County. Table 10 gives the probabilities of the last freezing temperature in spring and first in fall. The data in these tables are based on records kept at Winston-Salem, but some variability can be expected within the county.

The average length of the frost-free season is about 200 days, lasting from the second week in April until about November 1. The temperature falls below freezing at Winston-Salem on more than half the days in winter, but rarely remains that low for a complete 24-hour period. The temperature is as low as zero less than once in 10 years on the average, and it rises above 100° F. only slightly more often. Temperatures of 90° occur from late April through September, and on the average occur about 35 times in summer.

Much of the rainfall during the growing season comes from summer thunderstorms, but it may vary widely from place to place and from season to season. Hail may occasionally accompany a thunderstorm, but generally only a small area is affected. There may be periods of 1 to 3 weeks when a given locality is without significant rainfall, and irrigation may then serve to increase crop production. Winter rainfall results mainly from low-pressure storms moving through or near the area and is less variable than summer rainfall. There are no distinct wet and dry seasons, and measurable rain falls on an average of 1 to 3 days per week.

Some snow falls in Forsyth County every winter, but total amounts range from 1 inch to 2 feet. The average amount for a winter is about 9 inches. Generally, only a few inches accumulate at one time, and such accumulations usually melt within a few days. Once in several years, 8 or 10 inches of snow may fall at one time, and about as often, snow may cover the ground for a week or more. In 1960 the total amount of snowfall for the 3-month period, January through March, was 33 inches; snow accumulated to a depth of 14 inches at Winston-Salem, and some remained on the ground continuously from March 2 through March 23. Snowfall of this amount and duration is exceptional in Forsyth County.

The average proportion of sky covered with clouds during daylight is slightly more than half. The greatest amount of cloudiness is in winter and the least is in autumn. The sun shines about half the daylight hours in winter and nearly two-thirds of the daylight hours in other seasons. The average relative humidity is almost 80 percent at sunrise, and diminishes to about 50 percent at midafternoon.

Tropical storms from the Atlantic Ocean and Gulf of Mexico usually are much weakened if they move as far inland as Forsyth County. The highest winds most often result from summer thunderstorms, but such winds affect limited areas and are of short duration. There is a record of only one tornado that affected Forsyth County.

Surface wind directions are variable at all seasons. Winds from the southwest and northeast predominate

[7] By A. V. HARDY, climatologist for North Carolina, National Weather Service, U.S. Department of Commerce.

TABLE 9.—*Temperature and precipitation data*

[All data based on records from the weather station at Winston-Salem]

Month	Temperature				Precipitation					Average soil temperature at depth of 4 inches in bare, level soil (estimated)
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Days with snow cover 1 inch or more	Average depth of snow on days with snow cover	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—			
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*	*Number*	*Inches*	°F
January	50	32	68	14	3.7	1.6	6.2	4	2	42
February	52	32	71	18	3.5	1.5	5.9	2	2	42
March	59	37	75	22	4.0	2.4	5.8	2	4	49
April	70	47	85	32	3.6	1.9	5.7	[1]	1	58
May	79	56	90	42	4.0	1.2	6.4	0	0	70
June	87	65	96	53	3.6	1.7	7.1	0	0	78
July	88	68	97	60	4.6	2.3	8.1	0	0	80
August	87	67	95	58	4.3	2.0	7.7	0	0	79
September	81	62	92	46	3.6	.5	8.4	0	0	74
October	72	49	85	32	3.1	.9	7.2	0	0	63
November	60	38	76	24	2.8	.7	5.5	[1]	[2]	51
December	50	32	66	14	3.4	1.5	5.7	1	1	43
Year	70	49	[3] 98	[4] 10	44.2	32.9	54.3	9	2	61

[1] Less than ½ day.
[2] Less than ½ inch.
[3] Average annual highest temperature.
[4] Average annual lowest temperature.

TABLE 10.—*Probabilities of low temperatures in spring and in fall*

[Based on data from the weather station at Winston-Salem and modified for a rural environment]

Probability	Dates for given probability and temperature				
	16° F or lower	20° F or lower	24° F or lower	28° F or lower	32° F or lower
Spring:					
1 year in 10 later than	March 8	March 22	April 2	April 15	April 26
2 years in 10 later than	March 1	March 14	March 26	April 8	April 21
5 years in 10 later than	February 5	February 24	March 12	March 28	April 11
Fall:					
1 year in 10 earlier than	November 23	November 12	November 3	October 24	October 16
2 years in 10 earlier than	November 29	November 19	November 9	October 30	October 22
5 years in 10 earlier than	December 12	December 1	November 19	November 10	November 1

over winds from other directions, but winds from these two directions occur in about equal frequency. Northeasterly winds are more prevalent late in summer and in autumn, and southwesterly winds are more prevalent in other seasons. The strongest winds quite often are northwesterlies. The average surface wind is about 8 miles per hour.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Effective root zone. The part of the soil that is penetrated, or can be penetrated, by plant roots. In this survey the depth of the root zone is expressed in words as follows:

	Inches		*Inches*
Very shallow	Less than 10	Moderately deep	20 to 40
Shallow	10 to 20	Deep	40 to 60
		Very deep	More than 60

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood hazard. Water from stream overflow, from runoff or seepage, standing or flowing on the soil surface.

Frequency: None, less often than once in 50 years; very infrequent, once in 20 to 50 years; infrequent, once in 5 to 20 years; frequent, once in 1 to 5 years; very frequent, more often than once every year.

Duration: Extremely brief, shorter than 2 days; very brief, 2 to 7 days; brief, 7 days to 1 month; long, 1 month to 6 months; very long, longer than 6 months.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Forest type. A term used to describe stands that are similar in composition and development because of ecological factors. A forest type is temporary if its character has been caused by logging, fire, or other passing influences; it is permanent if no appreciable change is expected and its character is the result of ecological factors alone.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural soil drainage. Refers to the condition of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and in Podzolic soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction;

an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Residual material. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material in which a soil has formed.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles of clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which it belongs. The capability classification is discussed on pages 29 through 33. For information on the use of the soils for woodland, see the section beginning on page 56, including table 7, page 58. Other information is given in tables as follows:

Acreage and extent, table 1, page 5.
Estimated yields, table 2, page 34.
Engineering uses of the soils, tables 3, 4, and 5, pages 36, 40, and 44.
Wildlife, table 6, page 54.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
AlB	Altavista fine sandy loam, 1 to 6 percent slopes	6	IIe-1	30	2w8
ApB	Appling sandy loam, 2 to 6 percent slopes	6	IIe-1	30	3o7
ApC	Appling sandy loam, 6 to 10 percent slopes	7	IIIe-1	31	3o7
CcB	Cecil sandy loam, 2 to 6 percent slopes	7	IIe-1	30	3o7
CcC	Cecil sandy loam, 6 to 10 percent slopes	8	IIIe-1	31	3o7
CcD	Cecil sandy loam, 10 to 15 percent slopes	8	IVe-1	32	3o7
CeB2	Cecil clay loam, 2 to 6 percent slopes, eroded	8	IIIe-2	31	3o7
CeC2	Cecil clay loam, 6 to 10 percent slopes, eroded	8	IVe-2	32	3o7
Ch	Chewacla loam	9	IIIw-1	32	1w8
Co	Congaree complex	10	IIw-1	31	1o7
Cu	Cut and fill land	10	------	--	---
EnB	Enon fine sandy loam, 2 to 6 percent slopes	11	IIe-3	30	4o1
EnC	Enon fine sandy loam, 6 to 10 percent slopes	11	IIIe-3	31	4o1
EnD	Enon fine sandy loam, 10 to 15 percent slopes	11	IVe-3	32	4o1
Gu	Gullied land	12	VIIe-2	33	---
HlB	Hiwassee loam, 2 to 6 percent slopes	12	IIe-2	30	3o7
HlC	Hiwassee loam, 6 to 10 percent slopes	13	IIIe-2	31	3o7
HlD	Hiwassee loam, 10 to 15 percent slopes	13	IVe-2	32	3o7
HlE	Hiwassee loam, 15 to 25 percent slopes	13	VIe-2	33	3r8
HmB2	Hiwassee clay loam, 2 to 6 percent slopes, eroded	13	IIIe-2	31	3o7
HmC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded	13	IVe-2	32	3o7
HmD2	Hiwassee clay loam, 10 to 15 percent slopes, eroded	14	IVe-2	32	3o7
IrB	Iredell fine sandy loam, 2 to 6 percent slopes	14	IIe-3	30	4c2
LoD	Louisburg loamy sand, 6 to 15 percent slopes	15	VIe-1	33	3o7
LoF	Louisburg loamy sand, 15 to 45 percent slopes	15	VIIe-1	33	3r8
LwE	Louisburg-Wedowee complex, 15 to 25 percent slopes	15	VIIe-1	33	3r8
MaB	Madison fine sandy loam, 2 to 6 percent slopes	16	IIe-1	30	3o7
MaC	Madison fine sandy loam, 6 to 10 percent slopes	16	IIIe-1	31	3o7
MaD	Madison fine sandy loam, 10 to 15 percent slopes	16	IVe-1	32	3o7
MaF	Madison fine sandy loam, 15 to 45 percent slopes	17	VIe-1	33	3r8
McB2	Madison clay loam, 2 to 6 percent slopes, eroded	17	IIIe-2	31	3o7
McC2	Madison clay loam, 6 to 10 percent slopes, eroded	17	IVe-2	32	3o7
McD2	Madison clay loam, 10 to 15 percent slopes, eroded	17	VIe-2	33	3o7
MeB	Mecklenburg loam, dark surface variant, 2 to 6 percent slopes	18	IIe-3	30	4o1
MeC	Mecklenburg loam, dark surface variant, 6 to 10 percent slopes	18	IIIe-3	31	4o1
MeD	Mecklenburg loam, dark surface variant, 10 to 15 percent slopes	19	IVe-3	32	4o1
PaB	Pacolet fine sandy loam, 2 to 6 percent slopes	19	IIe-1	30	3o7
PaC	Pacolet fine sandy loam, 6 to 10 percent slopes	19	IIIe-1	31	3o7
PaD	Pacolet fine sandy loam, 10 to 15 percent slopes	20	IVe-1	32	3o7
PaF	Pacolet fine sandy loam, 15 to 45 percent slopes	20	VIe-1	33	3r8
PcB2	Pacolet clay loam, 2 to 6 percent slopes, eroded	20	IIIe-2	31	3o7
PcC2	Pacolet clay loam, 6 to 10 percent slopes, eroded	20	IVe-2	32	3o7
PcC3	Pacolet clay loam, 6 to 10 percent slopes, severely eroded	20	VIe-2	33	4c2e
PcD2	Pacolet clay loam, 10 to 15 percent slopes, eroded	21	VIe-2	33	3o7
PcF2	Pacolet clay loam, 15 to 45 percent slopes, eroded	21	VIIe-1	33	3r8
PeE3	Pacolet complex, 10 to 25 percent slopes, severely eroded	21	VIIe-2	33	4c3e

Map symbol	Mapping unit	Described on page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
PuC	Pacolet-Urban land complex, 2 to 10 percent slopes	21	------	--	---
PuE	Pacolet-Urban land complex, 10 to 25 percent slopes	21	------	--	---
TaD	Tallapoosa fine sandy loam, 6 to 15 percent slopes	22	VIe-1	33	4o1
TaF	Tallapoosa fine sandy loam, 15 to 45 percent slopes	22	VIIe-1	33	4r2
VaB	Vance sandy loam, 2 to 6 percent slopes	23	IIe-3	30	3o7
VaC	Vance sandy loam, 6 to 10 percent slopes	23	IIIe-3	31	3o7
VaD	Vance sandy loam, 10 to 15 percent slopes	24	IVe-3	32	3o7
WdB	Wedowee sandy loam, 2 to 6 percent slopes	24	IIe-1	30	3o7
WdC	Wedowee sandy loam, 6 to 10 percent slopes	25	IIIe-1	31	3o7
WdD	Wedowee sandy loam, 10 to 15 percent slopes	25	IVe-1	32	3o7
WeB	Wedowee-Louisburg complex, 2 to 6 percent slopes	25	IIIe-1	31	3o7
WeC	Wedowee-Louisburg complex, 6 to 10 percent slopes	25	IVe-1	32	3o7
WeD	Wedowee-Louisburg complex, 10 to 15 percent slopes	26	VIe-1	33	3o7
Wh	Wehadkee soils	26	IVw-1	32	1w9
WkB	Wickham fine sandy loam, 2 to 6 percent slopes	27	IIe-1	30	3o7
WkC	Wickham fine sandy loam, 6 to 10 percent slopes	27	IIIe-1	31	3o7
WkD	Wickham fine sandy loam, 10 to 15 percent slopes	28	IVe-1	32	3o7
WlC	Wilkes soils, 6 to 10 percent slopes	28	IVe-3	32	4o1
WlD	Wilkes soils, 10 to 15 percent slopes	29	VIe-1	33	4o1
WlF	Wilkes soils, 15 to 45 percent slopes	29	VIIe-1	33	4r2

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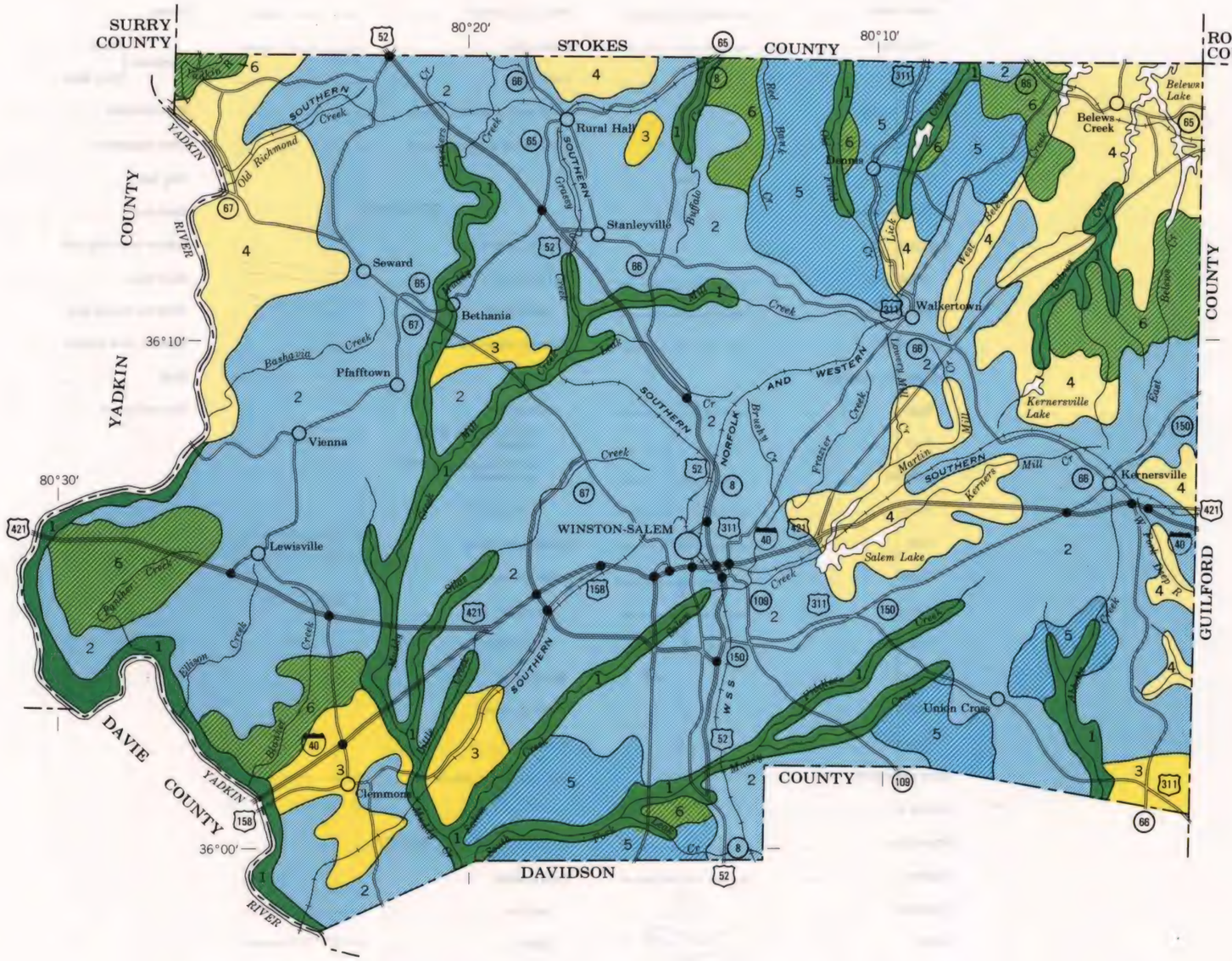


N

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

FORSYTH COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS*

1 — Chewacla-Wehadkee-Congaree association: Somewhat poorly drained and poorly drained, grayish and brownish, loamy soils that have a dominantly grayish subsoil, and well-drained, brownish, loamy soils that have a yellowish loamy subsoil; on flood plains subject to overflow

2 — Pacolet-Cecil association: Well-drained, brownish, loamy soils that have a reddish clayey subsoil; on uplands

3 — Enon-Mecklenburg-Vance association: Well-drained, brownish, loamy soils that have a yellowish or reddish clayey subsoil; on uplands

4 — Madison-Pacolet association: Well-drained, reddish and brownish, loamy soils that have a reddish clayey subsoil; on uplands

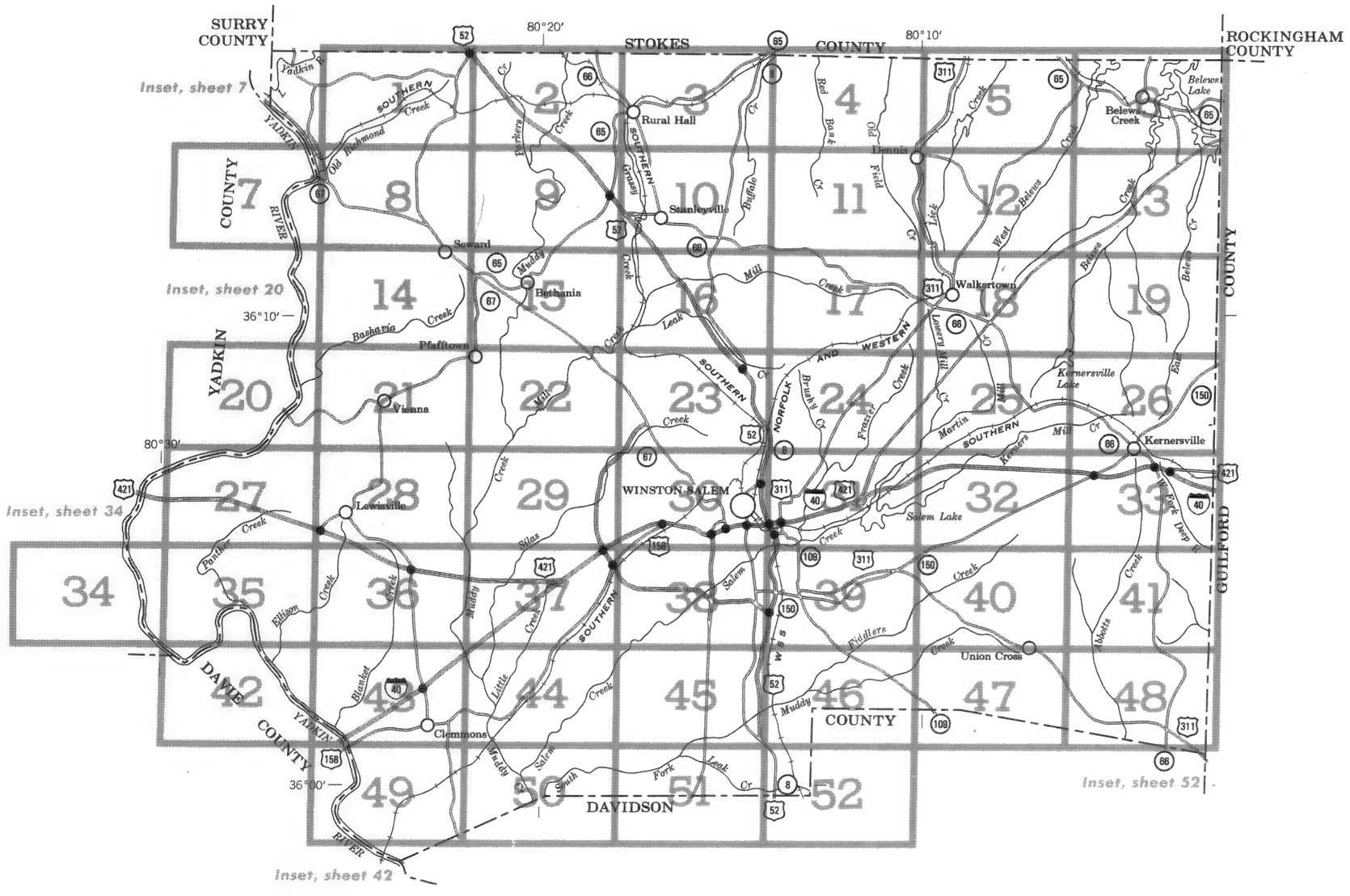
5 — Wedowee-Louisburg association: Well drained and excessively drained, brownish, loamy soils that have a yellowish clayey subsoil and brownish sandy soils that have a reddish sandy subsoil; on uplands

6 — Wilkes-Enon association: Well-drained, brownish, loamy soils that have a yellowish clayey subsoil; on uplands

*Colors and textures are those of the surface layer of the major soils unless otherwise indicated.

Compiled 1974

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



N

INDEX TO MAP SHEETS

FORSYTH COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 4 Miles

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, B, C, D, E, or F shows the slope. Most symbols without a slope letter are those of nearly level soils or land types, but some are for land types that have a considerable range of slope. The numbers, 2 or 3, in a symbol indicates that the soil is eroded or severely eroded.

SYMBOL	NAME
AlB	Altavista fine sandy loam, 1 to 6 percent slopes
ApB	Appling sandy loam, 2 to 6 percent slopes
ApC	Appling sandy loam, 6 to 10 percent slopes
CcB	Cecil sandy loam, 2 to 6 percent slopes
CcC	Cecil sandy loam, 6 to 10 percent slopes
CcD	Cecil sandy loam, 10 to 15 percent slopes
CeB2	Cecil clay loam, 2 to 6 percent slopes, eroded
CeC2	Cecil clay loam, 6 to 10 percent slopes, eroded
Ch	Chewacla loam
Co	Congaree complex
Cu	Cut and fill land
EnB	Enon fine sandy loam, 2 to 6 percent slopes
EnC	Enon fine sandy loam, 6 to 10 percent slopes
EnD	Enon fine sandy loam, 10 to 15 percent slopes
Gu	Gullied land
HlB	Hiwassee loam, 2 to 6 percent slopes
HlC	Hiwassee loam, 6 to 10 percent slopes
HlD	Hiwassee loam, 10 to 15 percent slopes
HlE	Hiwassee loam, 15 to 25 percent slopes
HmB2	Hiwassee clay loam, 2 to 6 percent slopes, eroded
HmC2	Hiwassee clay loam, 6 to 10 percent slopes, eroded
HmD2	Hiwassee clay loam, 10 to 15 percent slopes, eroded
IrB	Iredell fine sandy loam, 2 to 6 percent slopes

SYMBOL	NAME
LoD	Louisburg loamy sand, 6 to 15 percent slopes
LoF	Louisburg loamy sand, 15 to 45 percent slopes
LwE	Louisburg-Wedowee complex, 15 to 25 percent slopes
MaB	Madison fine sandy loam, 2 to 6 percent slopes
MaC	Madison fine sandy loam, 6 to 10 percent slopes
MaD	Madison fine sandy loam, 10 to 15 percent slopes
MaF	Madison fine sandy loam, 15 to 45 percent slopes
McB2	Madison clay loam, 2 to 6 percent slopes, eroded
McC2	Madison clay loam, 6 to 10 percent slopes, eroded
McD2	Madison clay loam, 10 to 15 percent slopes, eroded
MeB	Mecklenburg loam, dark surface variant, 2 to 6 percent slopes
MeC	Mecklenburg loam, dark surface variant, 6 to 10 percent slopes
MeD	Mecklenburg loam, dark surface variant, 10 to 15 percent slopes
PaB	Pacolet fine sandy loam, 2 to 6 percent slopes
PaC	Pacolet fine sandy loam, 6 to 10 percent slopes
PaD	Pacolet fine sandy loam, 10 to 15 percent slopes
PaF	Pacolet fine sandy loam, 15 to 45 percent slopes
PcB2	Pacolet clay loam, 2 to 6 percent slopes, eroded
PcC2	Pacolet clay loam, 6 to 10 percent slopes, eroded
PcC3	Pacolet clay loam, 6 to 10 percent slopes, severely eroded
PcD2	Pacolet clay loam, 10 to 15 percent slopes, eroded
PcF2	Pacolet clay loam, 15 to 45 percent slopes, eroded
PeE3	Pacolet complex, 10 to 25 percent slopes, severely eroded
PuC	Pacolet-Urban land complex, 2 to 10 percent slopes
PuE	Pacolet-Urban land complex, 10 to 25 percent slopes

SYMBOL	NAME
TaD	Tallapoosa fine sandy loam, 6 to 15 percent slopes
TaF	Tallapoosa fine sandy loam, 15 to 45 percent slopes
VaB	Vance sandy loam, 2 to 6 percent slopes
VaC	Vance sandy loam, 6 to 10 percent slopes
VaD	Vance sandy loam, 10 to 15 percent slopes
WdB	Wedowee sandy loam, 2 to 6 percent slopes
WdC	Wedowee sandy loam, 6 to 10 percent slopes
WdD	Wedowee sandy loam, 10 to 15 percent slopes
WeB	Wedowee-Louisburg complex, 2 to 6 percent slopes
WeC	Wedowee-Louisburg complex, 6 to 10 percent slopes
WeD	Wedowee-Louisburg complex, 10 to 15 percent slopes
Wh	Wehadkee soils
WkB	Wickham fine sandy loam, 2 to 6 percent slopes
WkC	Wickham fine sandy loam, 6 to 10 percent slopes
WkD	Wickham fine sandy loam, 10 to 15 percent slopes
WlC	Wilkes soils, 6 to 10 percent slopes
WlD	Wilkes soils, 10 to 15 percent slopes
WlF	Wilkes soils, 15 to 45 percent slopes

FORSYTH COUNTY, NORTH CAROLINA

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry (QU.)

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope

Prominent peak

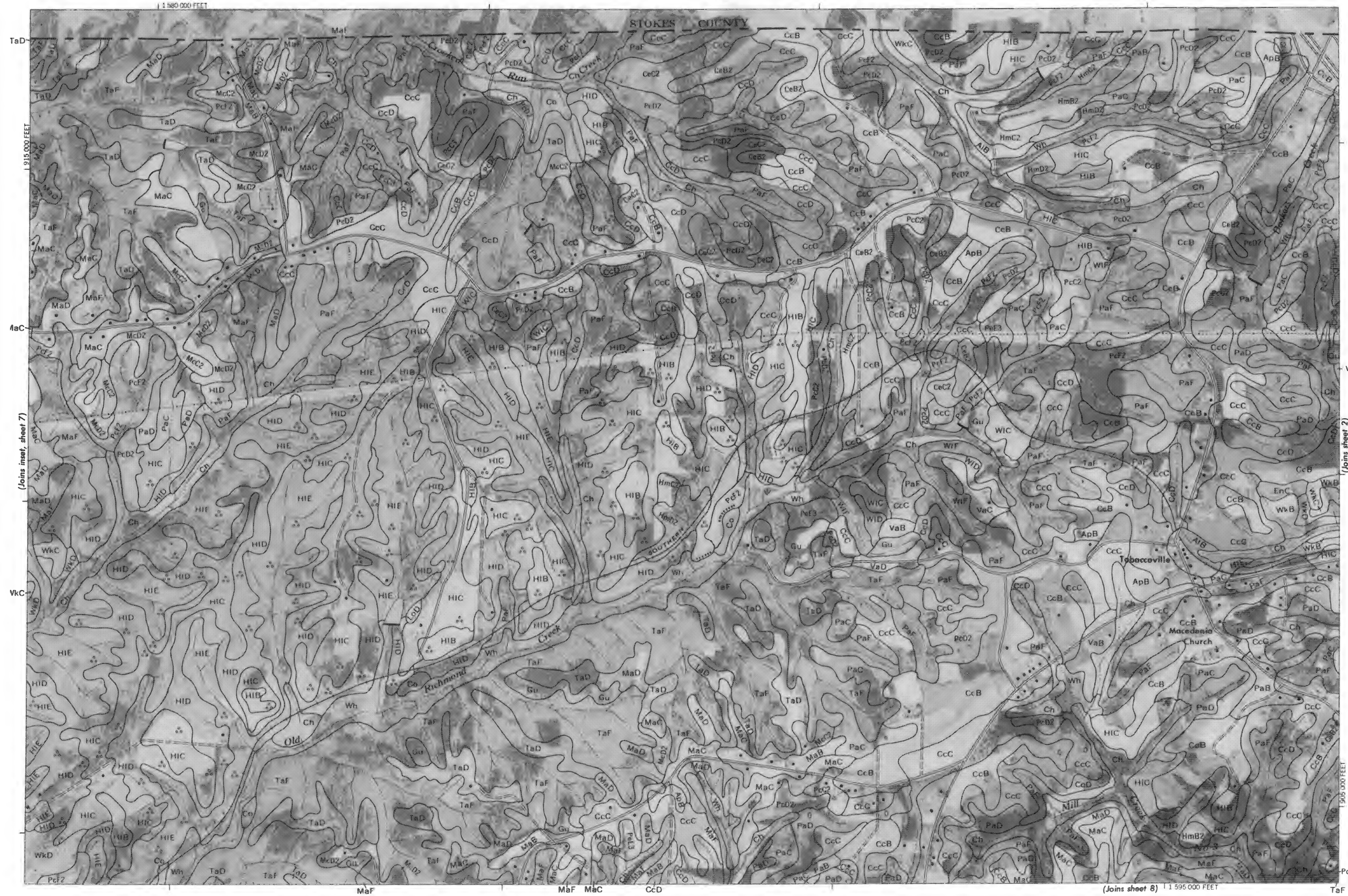
Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Soil sample site (S)

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 1



1

N

1 Mile

5000 Feet

Scale 1:15840

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 2

(2)

N

1 Mile

5000 Feet

Scale 1:15840

STOKES COUNTY

1 615 000 FEET

1 915 000 FEET

1 905 000 FEET

1 600 000 FEET

(Joins sheet 1)

(Joins sheet 3)

(Joins sheet 9)

Creek

Church

Rural Hall

Muddy

Jefferson

Burkers

Deaver

Dam

SOUTHERN

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 3

1 620 000 FEET

915 000 FEET

STOKES COUNTY

Bennertown

Rural Hall

SOUTHERN RAILWAY

Branch

Town Fork Creek

Peters Creek

Lewis Fork

Muddy Creek

Buffalo Creek

Rough Fork

Tyro Land Creek

(Joins sheet 2)

(Joins sheet 4)

(Joins sheet 10)

1 635 000 FEET

906 000 FEET

3

N

1 Mile

5000 Feet

Scale 1:15840

N

1 Mile

5000 Feet

Scale 1:15840

1 655 000 FEET

915 000 FEET

905 000 FEET

1 640 000 FEET

STOKES COUNTY

Reid Bank Creek

Old Field Creek

Walls Lakes

Mirzan Pond

Dennis

Newsom Industrial School

(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 11)

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 5

5

N

1 650 000 FEET

915 000 FEET

STOKES COUNTY

(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 12)

1 675 000 FEET

1 905 000 FEET

1 Mile

5000 Feet

Scale 1:15840

1 0 1/4 1/2 3/4 1 1000 2000 3000 4000 5000

6

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 5)

(Joins sheet 13)

1 690 000 FEET

915 000 FEET

905 000 FEET

1 680 000 FEET

STOKES COUNTY

GUILFORD COUNTY

BELEWS LAKE

Belews Creek

SOUTHERN RAILWAY

West Belews Creek

BELEWS CREEK

BELEWS LAKE


1 572 000 FEET
STOKES COUNTY
YADKIN
RIVER
LITTLE
SURRY COUNTY
YADKIN COUNTY
YADKIN
RIVER
Donnaha
1 915 000 FEET
1 577 000 FEET
(Joins upper right)
(Joins sheet 1)
WkC
WkD
1 905 000 FEET


(Joins lower left)
1 570 000 FEET
YADKIN COUNTY
YADKIN
RIVER
900 000 FEET
1 575 000 FEET
(Joins inset, sheet 20)
(Joins sheet 8)
HIE
MaF
TaF
1 895 000 FEET

7
N
1 Mile
5000 Feet
Scale 1:15840
0
1000
2000
3000
4000
5000

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 8

(8)

N

Scale 1:15840

1 Mile 0 5000 Feet

(Joins sheet 1)

(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 14)

1 595 000 FEET

1 590 000 FEET

1 585 000 FEET

1 580 000 FEET

Yellow Bethel Church

Old Richmond School

Elm Grove Church

Old Richmond Rd

Poultney Creek

Richmond

Old

Creek

Fries

Mill

Ch

WkD

HIE

Pcf2

TaD

TaF

MaC

MaD

MaF

MaB

McD2

McC2

PaB

PaC

PaD

PaF

CcC

CcB

CcD

HIB

HIC

HID

HmB2

HmC2

EnD

WIF

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 9

9

N

1 Mile

5000 Feet

Scale 1:15840

1 600 000 FEET

1 585 000 FEET

1 615 000 FEET

(Joins sheet 2)

(Joins sheet 8)

(Joins sheet 10)

(Joins sheet 15)

Rural Hall

Mizpeh Church

Muddy Creek

Speas Lake

water

Northwest Junior High School

10

N

1 Mile

5000 Feet

Scale 1:15840

1 000 0 1000 2000 3000 4000 5000

(Joins sheet 9)

(Joins sheet 16)

1 620 000 FEET

1 635 000 FEET

900 000 FEET

(Joins sheet 11)

Rural Hall

Stanleyville

St Andrews Church

Hickory Ridge Church

Providence Church

Creek

Branch

Rough

Fork

Buffalo

Ogburn

Ch

PcD2 CcC

PaD

PcF2

PcF2

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 11

11

N

1 Mile

5000 Feet

Scale 1:15840

1 640 000 FEET

900 000 FEET

1 650 000 FEET

1 655 000 FEET

(Joins sheet 10)

(Joins sheet 4) CeC2

(Joins sheet 12)

(Joins sheet 17)

Stokes Min Church

Shiloh Church

Old Ch

Creek Ch

Mill Creek

Dennis Branch

Rud Branch

Woodruff Br

Kinnamon Br

Mill Br

Old Mill Br

Western Br

Lowdermilk Br

Frid Br

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 12

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 13

(13)

N

1 690 000 FEET

1 900 000 FEET

(Joins sheet 6)

(Joins sheet 12)

(Joins sheet 19)

BELEWS LAKE

GUILFORD COUNTY

Grimes Crossroads

Goodwill Church

Peters Creek

Reedy Fork

East Fork

1 Mile

5000 Feet

Scale 1:15840

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 14

N

Scale 1:15840

1 Mile 5000 Feet

(Joins sheet 8)

(Joins inset, sheet 20)

(Joins sheet 21)

(Joins sheet 15)

1 595 000 FEET

890 000 FEET

880 000 FEET

1 580 000 FEET

Doster

Pleasant Hill Church

South Church

Seward

Bushavia

Hunters Creek

Creek

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 15

15

N

1 Mile

5000 Feet

Scale 1:15840

1 600 000 FEET

890 000 FEET

1 615 000 FEET

(Joins sheet 9)

(Joins sheet 14)

(Joins sheet 16)

(Joins sheet 22)

WINSTON-SALEM
(county seat)

Bethania

Old Town School

Cedar Forest Church

Immanuel Church

New Hope Church

Muddy Creek

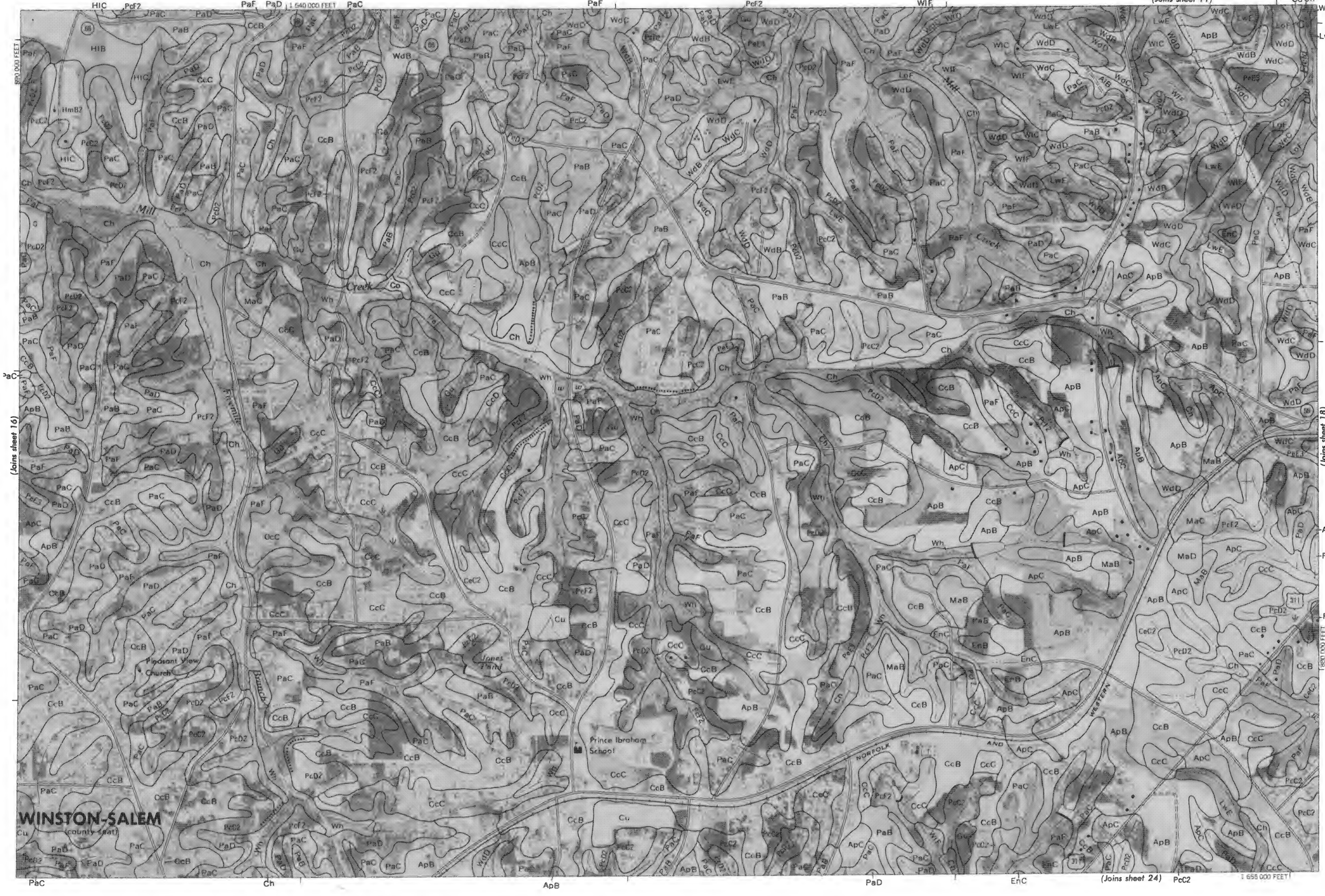
Bear Creek

Monument

CREEK


(Joins sheet 10)
1 670 000 FEET
N
1 Mile
5,000 Feet
Scale 1:15840
Stanleyville
WINSTON-SALEM
(county seat)
North Forsyth High School
Bethania Station
Banks Church
Old Town
Reynolda Church
Oak Summit Church
Monroe Cherry
QUARRY
SOUTHERN
CP&LES
Muddy Creek
Mill Creek
Salem Creek
Silas Creek
Co Leak
Fork
Ch
Cu
Wh
HIB
HIC
WIC
HmB2
HmC2
HmD2
PcF2
PaC
PaD
PaF
PcD2
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 23)
1 520 000 FEET
1 580 000 FEET
890 000 FEET

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 17



N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 12)

(Joins sheet 17)

(Joins sheet 25)

(Joins sheet 19)

1 675 000 FEET

1 665 000 FEET

Walkertown

Walkertown School

NORFOLK AND WESTERN

Beaverdam Creek

Lick Creek

Burkes Creek

Muddy Creek

Kernersville

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 19

19

N

1 Mile

5000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 20

(20)

N

1 Mile 5000 Feet

0 0

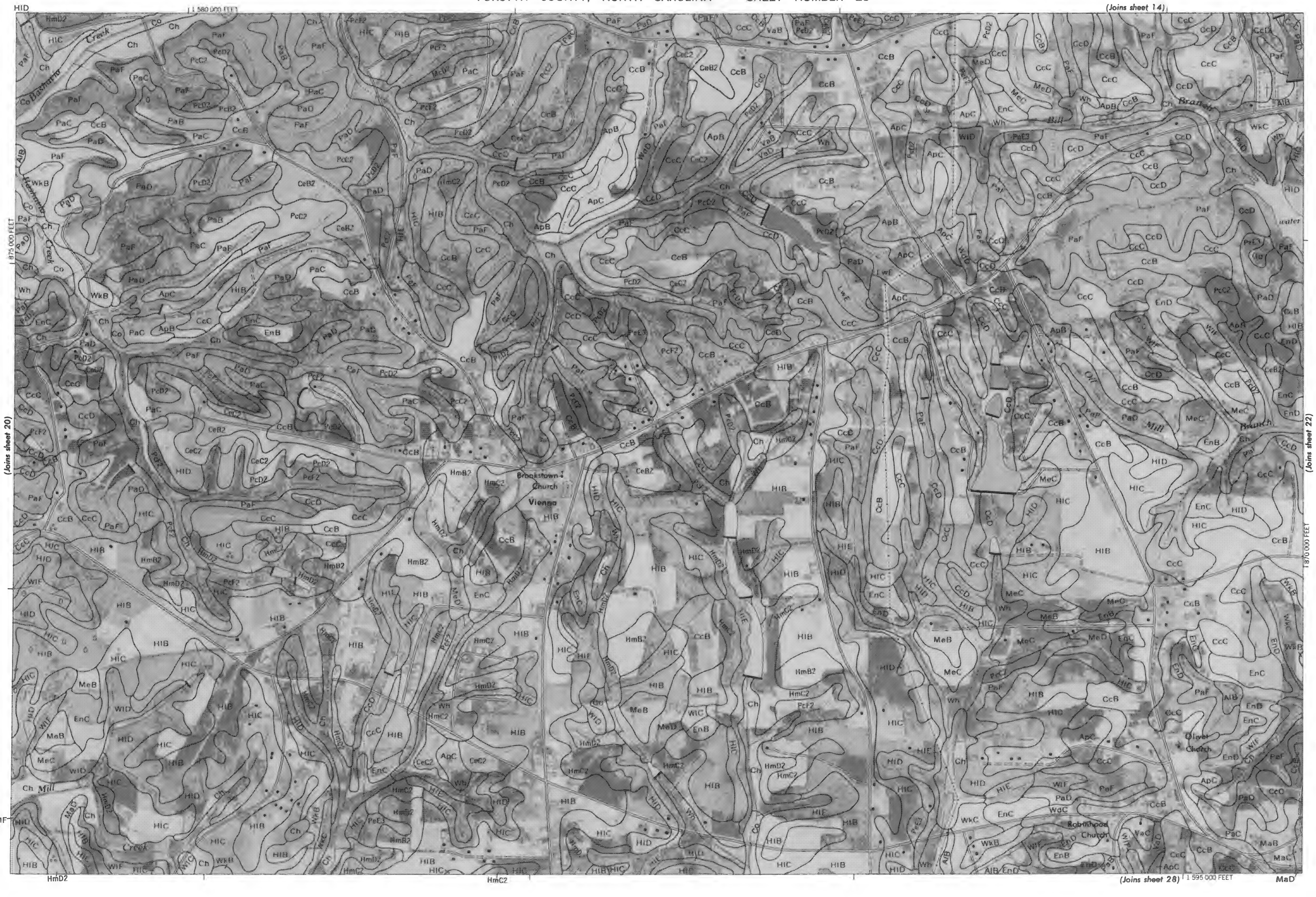
Scale 1:15840

1 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

3 000 AND 5 000-FOOT GRID TICKS

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 21



21

N

1 Mile

5000 Feet

Scale 1:15840

N

1 Mile

5000 Feet

Scale 1 : 15 840

1 inch = 1 000 feet

1 inch = 2 000 feet

1 inch = 3 000 feet

1 inch = 4 000 feet

1 inch = 5 000 feet

(Joins sheet 15)

(Joins sheet 21)

(Joins sheet 23)

(Joins sheet 29)

1 615 000 FEET

1 875 000 FEET

870 000 FEET

1 600 000 FEET

Plaftown

Valley View

FORSYTH MEMORIAL PARK CEMETERY

WINSTON-SALEM

(County Seat)

Oldtown Church

Clouard Lake

Crystal Lake

Northwest Church

Mt Tabor High School

Mt Tabor Church

Bill Branch Creek

Mill Branch Creek

Muddy Creek

James Branch

Mill Creek

CcC MaD

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 23

1 620 000 FEET

(Joins sheet 16)

1 875 000 FEET

WINSTON-SALEM

Oak Crest

Reynolda

Reynolda Park

WAKE FOREST UNIVERSITY

Alspaugh

Forest Hills

Bon Air

Bethabara Church

College Park Church

Maple Spring Church

Wesley B Sparks School

Crystal Lake

Forest Hill Church

Monarcas

Silas Creek

Creek

Leak

Fork

SOUTHERN

WESTERN

NORFOLK

(Joins sheet 22)

(Joins sheet 24)

(Joins sheet 30)

1 635 000 FEET

865 000 FEET

23

N

1 Mile

5000 Feet

Scale 1:15840

1 5000 | ¾ 4000 | ½ 3000 | ¼ 2000 | 0 1000 | 0

N

1 Mile 5000 Feet

Scale 1:15840

(Joins sheet 17)

1 656 000 FEET

1 875 000 FEET

(Joins sheet 23)

(Joins sheet 25)

865 000 FEET

(Joins sheet 31)

1 640 000 FEET

MaF

Wh

PcD2

PcB2

Obburn Station

Montview

SMITH REYNOLDS AIRPORT

WINSTON-SALEM
(county seat)

Brookwood

Park Terrace

Drive-In School

Fourth Creek

Brushy Fork

Silas Creek

Muddy Creek

Western Blvd

Hanes Mall Blvd

Peters Creek Pkwy

Cu

PaB PaC PaD PaF PcB2 PcC2 PcD2 PcF2 ApB ApC CcB CcC PuC PuE PeF3 MaB MaC MaD MaF McC2 McD2 WhB WhC WlC WlF EnC EnD VaC AlB HlB HlC HmB2 HmC2 HmD2 HlE Ch Gu

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 25

25

N

Scale 1:15840

1 Mile

5000 Feet

1 660 000 FEET

1 675 000 FEET

1 670 000 FEET

1 665 000 FEET

(Joins sheet 18)

(Joins sheet 24)

(Joins sheet 26)

(Joins sheet 32)

KERNERSVILLE LAKE

Kerwin Church

Talleys Crossing

Kerwin Church

Pisgah Church

Guthrie

SOUTHERN

Mill Creek

Muddy Creek

Lowrey Creek

Marlin Creek

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 19)

(Joins sheet 25)

(Joins sheet 33)

1 690 000 FEET

1 675 000 FEET

1 665 000 FEET

GUILFORD COUNTY

Piney Grove Church

Kernersville School

Kernersville

SOUTHERN

Fish Hatchery

N

1 Mile

5000 Feet

Scale 1:15840

1 inch = 0.25 mile

1 centimeter = 0.1 kilometer

1 955 000 FEET

1 860 000 FEET

1 855 000 FEET

1 575 000 FEET

YADKIN COUNTY

YADKIN RIVER

Grapevine Church

Grapewood

West Bend

Panther Creek

Hampton Creek

water

(Joins inset, sheet 34)

(Joins sheet 20)

(Joins sheet 28)

(Joins sheet 35)

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 28

28

N

Scale 1:15840

1 Mile

5000 Feet

(Joins sheet 21)

(Joins sheet 27)

(Joins sheet 29)

(Joins sheet 36)

1 595 000 FEET

865 000 FEET

855 000 FEET

1 580 000 FEET

Community Church

Shallowford Lakes

Shiloh Church

Lewisville

Ellbow Creek

Shoreh Church

Reynolds

Tomahawk

Creek

MUDDY Creek

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 29

29

N

1 Mile

5000 Feet

Scale 1:15840

1 600 000 FEET

1 615 000 FEET

1 855 000 FEET

(Joins sheet 22)

(Joins sheet 28)

(Joins sheet 30)

(Joins sheet 37)

WINSTON-SALEM
(county seat)

Mt Tabor

Burkhead Church

Church of the Epiphany

Sherwood Forest School

Parkway Church

MUDDY CREEK

SILAS CREEK

Little Creek

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 30

(30)

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 23)

(Joins sheet 29)

(Joins sheet 31)

(Joins sheet 38)

1 635 000 FEET

1 860 000 FEET

1 855 000 FEET

1 820 000 FEET

Reynolda Park

Buena Vista

WINSTON-SALEM

(county seat)

Westview

West Highlands

Ardmore

Old Salem

Salem Academy

Salem College

SOUTHERN

WESTERN

NORFOLK

Peters Creek

Little Creek

Silas Creek

Salem Creek

Muddy Creek

Ch

Cu

Co

Lou

Lee

PaB

PaC

PaD

PaF

PcC2

PcD2

PcF2

PuC

PuE

PuG

CcB

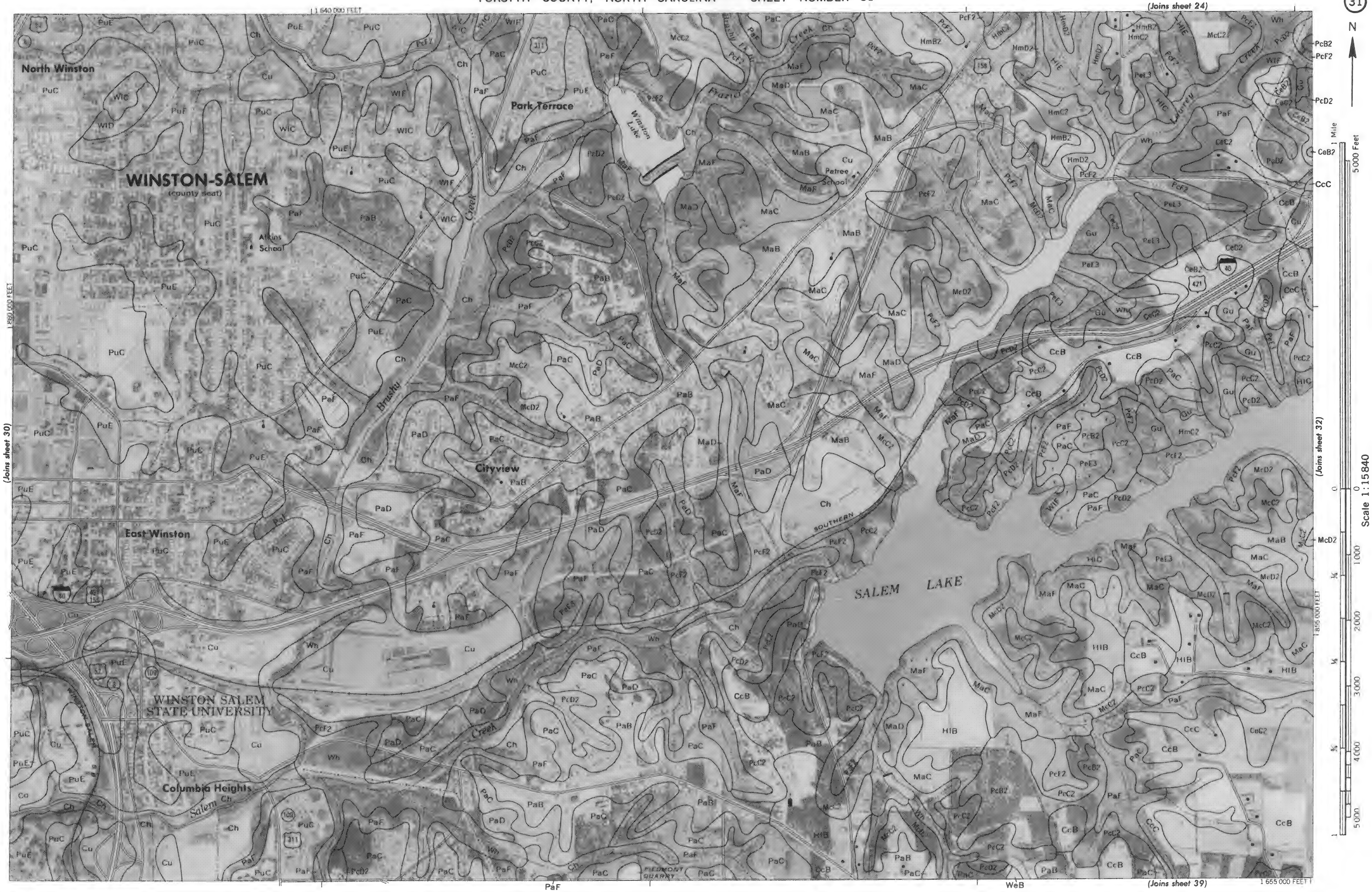
CcC

ApB

VaC

HlB

HlC


31
(Joins sheet 24)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 39)
1 640 000 FEET
1 655 000 FEET
1 850 000 FEET
1 855 000 FEET
North Winston
WINSTON-SALEM
(county seat)
Park Terrace
Winston Lake
Petree School
Atkins School
Cityview
East Winston
WINSTON SALEM STATE UNIVERSITY
Columbia Heights
SALEM LAKE
Brushy Creek
Salem Ch
Frazier Creek
Lowrey Creek
SOUTHERN
PIEDMONT QUARRY
N
1 Mile
5000 Feet
Scale 1:15840

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 32

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 33

33

N

1 675 000 FEET

(Joins sheet 26)

960 000 FEET

(Joins sheet 32)

KERNERSVILLE

SOUTHERN

Southern Pilgrim College

Creek

Smith

Mathis

Abbotts

Creek

Dyer

Fork

Dyer

Fork

Whites

Creek

GUILFORD COUNTY

855 000 FEET

LwE

VaD

PcF2

(Joins sheet 41)

1 690 000 FEET

PeE3

1 Mile

5000 Feet

Scale 1:15840


34
N
1 Mile
5000 Feet
Scale 1:15840
1 557 000 FEET
865 000 FEET
(Joins upper right)
(Joins sheet 27)
1 562 000 FEET
HIC
CcD
YADKIN COUNTY
YADKIN RIVER
(Joins lower right)
1 555 000 FEET
850 000 FEET
(Joins sheet 35)
845 000 FEET
1 550 000 FEET
42


(Joins sheet 27)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 42)
1 575 000 FEET
1 540 000 FEET
YADKIN — RIVER
DAVIE COUNTY
Creek
Scale 1:15840
1 Mile
5000 Feet

N

Scale 1:15840

1 Mile

5000 Feet

(Joins sheet 28)

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 43)

1 595 000 FEET

1 850 000 FEET

1 840 000 FEET

1 580 000 FEET

Harmony Grove

Cupernium

Ellison Creek

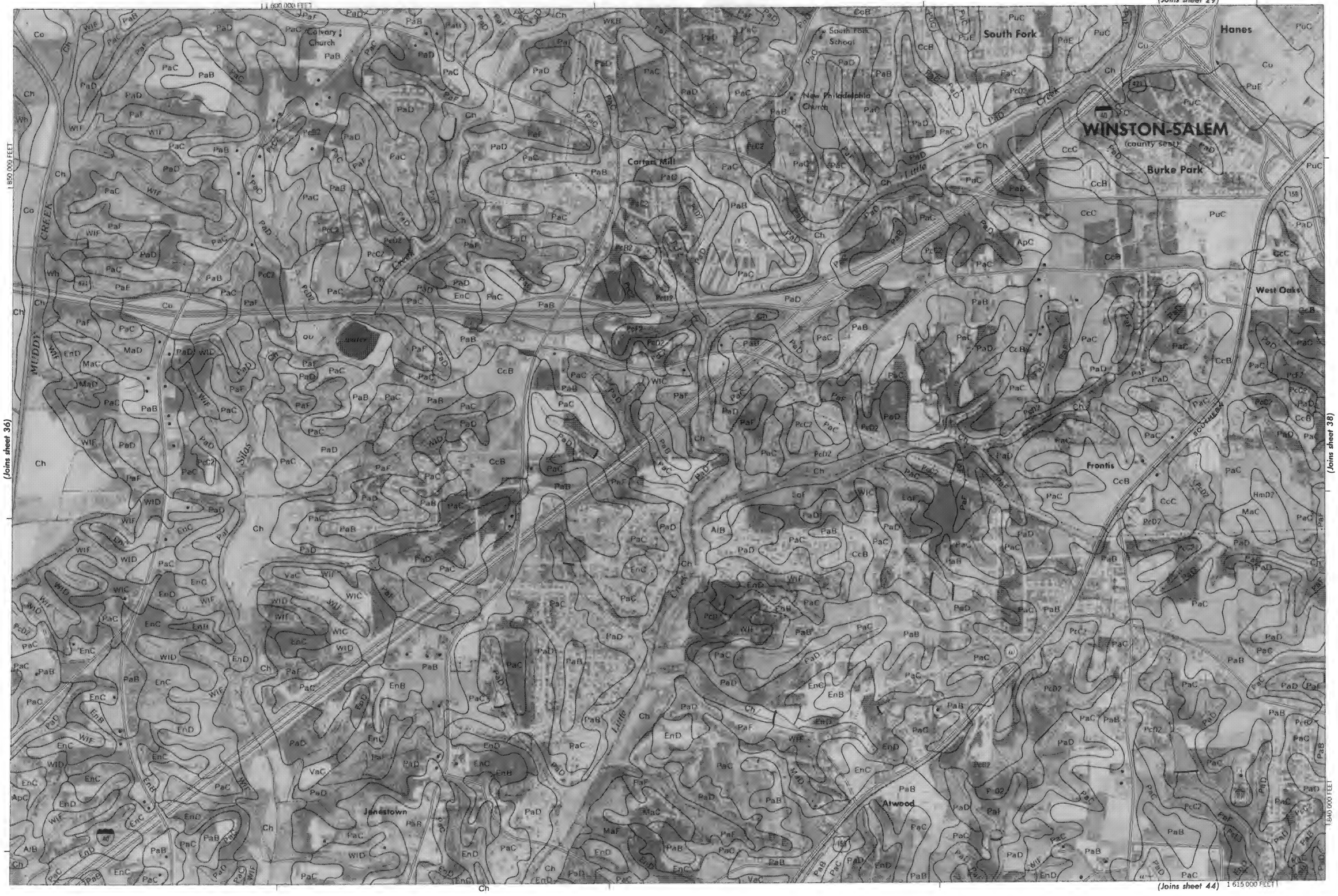
Fleuser Creek

Flannel Creek

Muddy Creek

421

CcC


1 890 000 FEET
1 850 000 FEET
1 840 000 FEET
1 615 000 FEET
(Joins sheet 29)
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 44)
WINSTON-SALEM
(county seat)
Hanes
South Fork
Burke Park
West Oaks
Frontis
Atwood
Jonestown
Cotton Mill
Calvary Church
South Fork School
New Philadelphia Church
Little Creek
Muddy Creek
Silos
water
37
N
1 Mile
5000 Feet
Scale 1:15840
1
0
1000
2000
3000
4000
5000

N

1 Mile 5000 Feet

Scale 1:15840

(Joins sheet 30)

(Joins sheet 37)

(Joins sheet 39)

(Joins sheet 45)

1,635,000 FEET

1,640,000 FEET

1,620,000 FEET

Hanes

Ardmore

West Salem

South Side

Arcadia

WINSTON-SALEM
(county seat)

Fisherville

FORSYTH MEMORIAL HOSPITAL

FORSYTH TECHNICAL INSTITUTE

SOUTHERN

SALEM CREEK

Silas Creek

Ty Branch

Ch

Co

Cu

PuC

PuE

PaB

PaC

PaD

PaF

PcC2

PcD2

PcE3

PcF2

CcB

CcC

CcD2

CcE2

CcF2

HmB2

HmC2

HmD2

HmE2

HmF2

HlB

HlC

HlD2

HlE2

HlF2

MaB

MaC

MaD

MaF

McC2

McD2

McE2

McF2

MeB2

MeC2

MeD2

MeE2

MeF2

WlB

WlC

WlD2

WlE2

WlF2

AlB

AlF

Gu

LaF

TaF

(39)

N

1 640 000 FEET

1 650 000 FEET

1 850 000 FEET

1 860 000 FEET

(Joins sheet 31)

(Joins sheet 38)

(Joins sheet 40)

(Joins sheet 46)

WINSTON-SALEM
(county seat)

Sunnyside

Waughtown

Easton View

Union Ridge

PIEDMONT QUARRY

Myers Pond

Fiddlers Creek

WINSTON-SALEM SOUTHBOUND

1 Mile

5 000 Feet

Scale 1:15840

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 32)

(Joins sheet 39)

(Joins sheet 47)

(Joins sheet 41)

1 670 000 FEET

1 665 000 FEET

850 000 FEET

840 000 FEET

Oak Lawn Church

Glenn View Church

Robert B. Glenn High School

Friendland Church

Fellowship Church

Union Cross

Fiddlers Creek

Muddy Fork Creek

South Fork Muddy Creek

Swamp Creek

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 41

41

N

1 Mile

5000 Feet

Scale 1:15840

1 inch = 1320 feet

1 centimeter = 158.4 meters

(Joins sheet 33)

(Joins sheet 40)

(Joins sheet 48)

1 675 000 FEET

1 690 000 FEET

1 850 000 FEET

1 840 000 FEET

GUILFORD COUNTY

Creek

Abbotts

Bunker Hill Church

Faith Church


N
1 Mile
5000 Feet
Scale 1:15840
(Joins sheet 35)
(34)
YADKIN CO.
YADKIN RIVER
DAVIE COUNTY
1 575 000 FEET
840 000 FEET
(Joins sheet 43)
PaB
VaB
WdD
(Joins sheet 49)
1 595 000 FEET
814 000 FEET
YADKIN RIVER
DAVIE COUNTY
DAVIDSON COUNTY
830 000 FEET
809 000 FEET
1 585 000 FEET
1 560 000 FEET
Co
Ch
WkB
AlB
HIC
HIB
HID
HIE
PaC
PaD
PaF
CcB
CcC
CcD
EnC
EnD
WIF
WIC
MaC
MaD
VaC
WkC
WkD
ApC
PaB

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 43

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 37)

(Joins sheet 43)

(Joins sheet 45)

(Joins sheet 50)

1 615 000 FEET

835 000 FEET

830 000 FEET

1 600 000 FEET

WINSTON-SALEM
(county seat)

Atwood

SEWAGE TREATMENT PLANT

QUARRY

Muddy Creek

Silas Creek

MUDDY CREEK

Little CREEK

SOUTHERN

SALEM

45

N

1 Mile

5000 Feet

Scale 1:15840

1 630 000 FEET

1 633 000 FEET

1 636 000 FEET

1 639 000 FEET

1 642 000 FEET

836 000 FEET

833 000 FEET

830 000 FEET

(Joins sheet 38)

(Joins sheet 44)

(Joins sheet 46)

(Joins sheet 51)

WINSTON-SALEM
(county seat)

Rosemont

Rosemont Church

Covenant Church

Fisherville

Griffith School

Advent Church

Swaimtown

Five Points

Hopewell Church

SOUTH FORK MUDDY CREEK

N

1 Mile 5000 Feet

Scale 1:15840

(Joins sheet 39)

(Joins sheet 45)

(Joins sheet 47)

(Joins sheet 52)

1 650 000 FEET

1 635 000 FEET

1 635 000 FEET

WINSTON-SALEM
(county seat)

DAVIDSON COUNTY

DAVIDSON COUNTY

Antioch Church

Fellowship Church

New Friendship Church

Fiddlers Creek

Muddy Creek

South Fork

Saw Mill Br

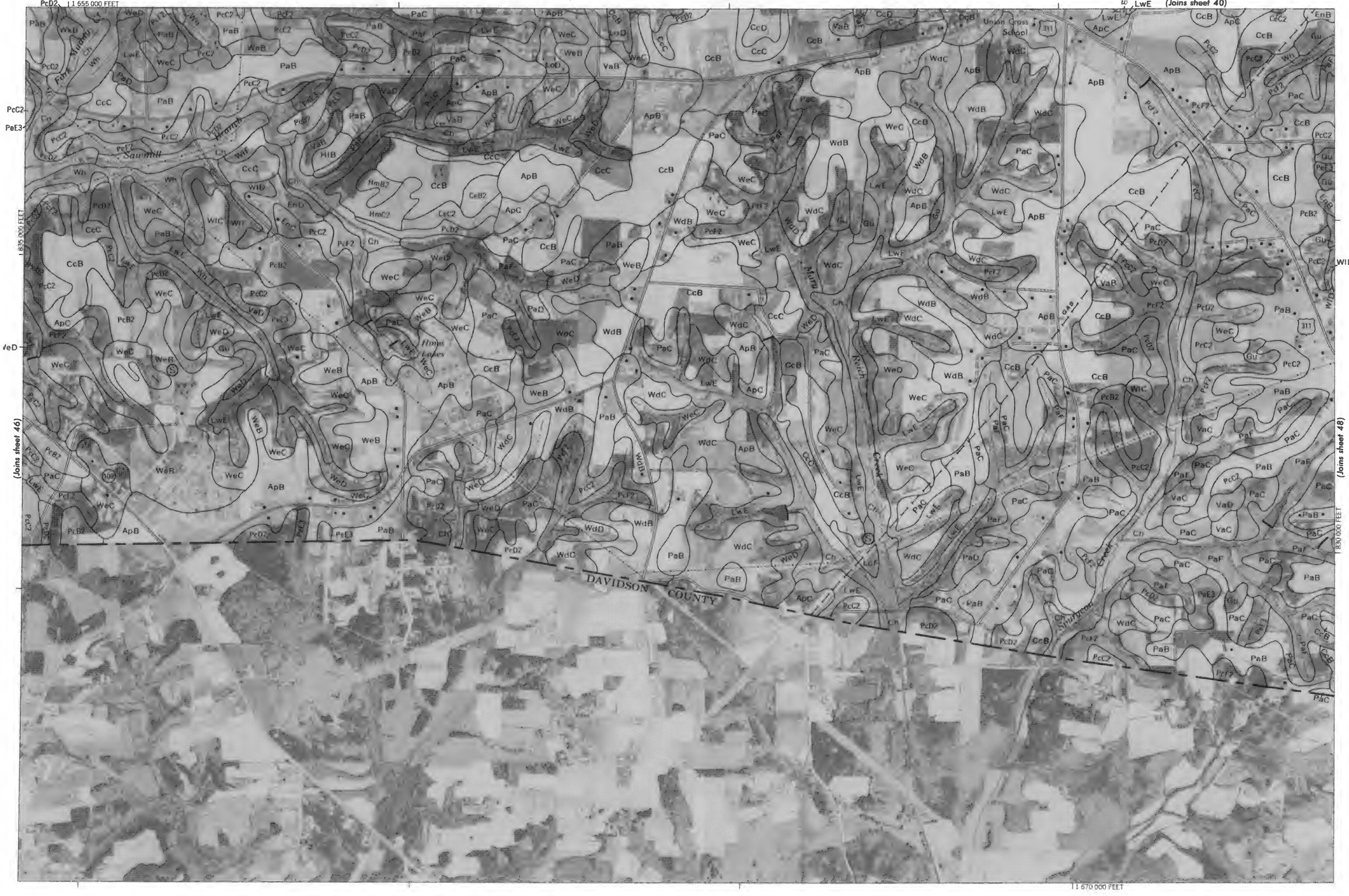
Stinking Quarter Creek

Smokes Creek

52

WIF

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 47



48

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 41)

(Joins sheet 47)

839 000 FEET

1 690 000 FEET

1 675 000 FEET

Abbotts Creek

Cheatham Branch

Rich Fork

Peoquetown

Horneytown

GUILFORD COUNTY

DAVIDSON COUNTY

(Joins inset, sheet 52)


1 580 000 FEET
1 825 000 FEET
MeB MeC
(Joins sheet 43)
DAVIE COUNTY
YADKIN RIVER
TANGLEWOOD PARK
MALLARD LAKE
Skipper Lake
Coon Lake
Johnson Creek
Clemmons Station
SOUTHERN
DAVIDSON COUNTY
(Joins sheet 50)
(Joins inset, sheet 42)
1 595 000 FEET
1 815 000 FEET
49
N
1 Mile
5000 Feet
Scale 1:15840
0
1/4
1/2
3/4
1
1000
2000
3000
4000
5000

50

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 50

N

(Joins sheet 44)

1 615 000 FEET

1 825 000 FEET

(Joins sheet 51)

(Joins sheet 49)

Scale 1:15840

1 Mile

5000 Feet

0 1000 2000 3000 4000 5000

¼ ½ ¾ 1

1 815 000 FEET

1 600 000 FEET

MUDDY CREEK

SALEM CREEK

SOUTH FORK MUDDY CREEK

WATER TREATMENT PLANT

DAVIDSON COUNTY

FORSYTH COUNTY, NORTH CAROLINA — SHEET NUMBER 51

51

N

(Joins sheet 45)

(Joins sheet 52)

DAVIDSON COUNTY

1 620 000 FEET

1 630 000 FEET

1 815 000 FEET

1 Mile

5000 Feet

Scale 1:15840

52

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 46)

(Joins sheet 51)

DAVIDSON COUNTY

FORSYTH COUNTY

Southbound Creek

Leak

1 650 000 FEET

1 635 000 FEET

815 000 FEET

(Joins sheet 48)

1 692 000 FEET

1 687 000 FEET

824 000 FEET

825 000 FEET

GUILFORD COUNTY

1 000 AND 5 000-FOOT GRID TICKS